McHenry County
Division of Transportation

TRAFFIC SIGNAL DESIGN GUIDELINES

December 2008

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PLAN APPROVAL PROCESS

1. Designer Prequalification

The firm supplying plans to the McHenry County Division of Transportation (MCDOT or County) must be prequalified with the Illinois Department of Transportation in "Special Plans - Traffic Signals," and its signal design staff shall be familiar with the latest traffic signal design procedures used by the County.

The firm's signal designer may schedule a preliminary meeting with the County Engineer to discuss project specific issues on projects involving complex designs. If requested by the County, the signal designer shall provide copies of their most recent traffic signal installation design and/or modification projects completed for projects in the County.

Interaction between a traffic signal design firm and the County must be on a shared benefit basis. If, in the opinion of the County, the firm is attempting to design plans beyond the level of competence of its staff, the County may require use of outside firm to assistance in design of project.

The firm is expected to provide interpretive assistance and revisions to their work up to and through the construction phase of the project.

2. Items Available from the County

The following items are available in either electronic or hard copy format from the County upon request for use in the design process:

- MCDOT Traffic Signal Specifications.
- IDOT Mast Arm Mounted Street Name Sign Sheet.
- IDOT Standard Traffic Signal Design Detail Sheets.
- Existing Traffic Signal Plans or Samples.

3. Plan Submittals

Two full-size sets of plans, specifications and cost estimate should be submitted along with the Checklist for Traffic Signal Plan Submittals (shown on page 3). After the first submittal, all subsequent submittals should include a letter with responses to review comments and the marked-up plans and specifications from the previous review.

4. Final Submittal

Upon final plan approval, the County will request the final plan submittal be made by the Consultant. The final plan submittal should include the following items:

- Checklist for Traffic Signal Plan Submittals (next page).
- One full-size reproducible (mylar) plan set, signed and sealed.
- Four full-size paper plan sets, signed and sealed.
- Four sets of specifications.
- Four copies of the Estimate of Cost, signed and sealed.

- CD containing MicroStation (Version 8) files for entire project. The names of the MicroStation files should include both of the street names at the intersection and the file type, for example:

Cover Sheet	01_Virginia&Pyott to Berkshire_CVR
Summary of Quantities	02_Virginia&Pyott to Berkshire_SUM
Temporary Traffic Signal Plan	03_Virginia&Pyott_TMP
Temporary Cable Plan	04_Virginia&Pyott_TCB
Traffic Signal Installation Plan	05_Virginia&Pyott_TSI
Traffic Signal Modification Plan	05_Virginia&Pyott_MOD
Cable Plan	06_Virginia&Pyott_CAB
Sequence of Operation	07_Virginia&Pyott_SEQ
Interconnect Plan	08_Virginia&Pyott to Berkshire_INT
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Video Detection Details Sheet	11_Virginia&Pyott to Berkshire_VDT
IDOT Standard Traffic Signal Design Details Sheets	12_Virginia&Pyott_IDOTDTLS
IDOT Typical Pavement Markings	13_Virginia&Pyott_IDOTMKGS

- The CD shall also contain a PDF file for the entire plan set (full size).

5. Checklist

The Checklist on the following page should be completed and submitted with each plan submittal.

CHECKLIST

Traffic Signal Plan Submittals

McHenry County
Division of Transportation

Joseph R. Korpalski, Jr., P.E.
Director of Transportation/County Engineer

SUBMITTED TO:	SUBMITTAL DATE:	JOB: PERMIT / COUNTY / FEDERAL
MAIN ROUTE:	CROSS STREET:	LIMITS OF PROJECT:
DESCRIPTION:		
THIS IS THE: 1ST 2ND 3RD 4TH 5TH OR FINAL SUBMITTAL OF THIS PLANSET		
SIGNAL PROJECT/PLAN SET IS: Stand Alone	Part of Roadway Improvement Planset Separate from Roadway Improvement Planset	
DESIGN FIRM FOR TRAFFIC SIGNAL PLANS:		
Designed by:	Drawn By:	Checked by:
DESIGN FIRM FOR ROADWAY IMPROVEMENT PLANS:		

THE FOLLOWING ITEMS ARE INCLUDED IN THIS SUBMITTAL:

- ☐ Roadway Improvement Plans
- ☐ Signed and Sealed Cover Sheet
- ☐ Signed and Sealed Cost Estimate
- ☐ Summary of Quantities
- ☐ Mast Arm Mounted Street Name Signs
- ☐ Traffic Signal Specifications
- ☐ Marked-up Plans from Previous Review
- ☐ Mylar Plans
- ☐ IDOT District 1 Standard Traffic Signal Design Details Sheets
- ☐ IDOT District 1 Typical Pavement Markings
- ☐ Letter Responding to Previous Review Comments
- ☐ CD Containing MicroStation Files and PDF Files for Project

YES	NO	N/A	1) An Intersection Design Study has been completed for this project
YES	NO	N/A	2) These Plans are being submitted to IDOT for review and comment.
YES	NO	N/A	3) Temporary Traffic Signals are required for these improvements.
YES	NO	N/A	4) The Municipalities have been contacted regarding EVP equipment installation.
YES	NO	N/A	MCDOT has received a copy of this correspondence.
YES	NO	N/A	5) The Electric Company has been contacted regarding Service installation.
YES	NO	N/A	MCDOT has received a copy of this correspondence.
YES	NO	N/A	6) The Telephone Company has been contacted regarding Telephone Service.
YES	NO	N/A	MCDOT has received a copy of this correspondence.

OTHER COMMENTS:

PLAN FORMAT

1. General

Each sheet in the plans shall include and/or shall follow the following:

- Border.
- Design firm's name, address, telephone number and fax number.
- Sheet number block.
- Title block (except cover sheet).
- Sheet size shall be 24" high by 36" wide.
- North arrows, which should be oriented consistently throughout the plans, should be pointed up or to the right.
- Match lines shall be used when segments of roadway must be broken up on the plan sheets (break lines are not allowed).
- Minimum lettering size may be as small as 0.10 inches if capital letters are used. Titles and Phase Designation Diagrams must have 0.15 inch or larger lettering.

The designer shall have a thorough understanding of Chapter 63 of IDOT's "*Bureau of Design and Environment Manual*."

All plan-sets shall be submitted with sheets in the following order:

1. Cover Sheet.
2. Summary of Quantities.
3. Temporary Traffic Signal Plan (If required).
4. Temporary Cable Plan (If required).
5. Traffic Signal Installation or Modification Plan.
6. Cable Plan, Schedule of Quantities & Phase Designation Diagram.
7. Normal Sequence of Operation, Railroad Preemption Sequence of Operation & Emergency Vehicle Preemption Sequence of Operation (If required).
8. Interconnect Plan.
9. Interconnect Schematic & Schedule of Quantities.
10. Video Detection Details Sheet.
11. Mast Arm Mounted Street Name Signs.
12. LCDOT Standard Traffic Signal Design Detail Sheets.
13. District One Standard Signal Design Detail Sheets.
14. District One Typical Pavement Markings.

(See Appendix C for examples.)

2. Cover Sheet

A Cover Sheet is required for all projects, and shall include:

- Designer name and phone number in the left side margin.
- Sheet number block.
- Index of Sheets.
- Location map.
- Signature block for Engineer's seal.

3. Summary of Quantities

A Summary of Quantities is required for all improvement projects, and shall include:

- The Summary of Quantities sheet shall list items in pay item Code Number sequence, with the full pay code item description. Each item shall be broken into sub-quantities per location and function. The amount of sub-quantity to be paid for by each participating Agency shall be listed. The total quantity shall match the balance of the sub-quantities.

- The body of the quantities should be in capital letters and include: CODE NUMBER, UNIT, ITEM, and QUANTITY. Items shall be in exactly the same Code Number order as on the Estimate of Cost pages or schedule.

4. Temporary Traffic Signal Plan

When temporary traffic signals are required, the Temporary Traffic Signal Plan shall include:

- North arrow and scale of 1" = 20'.
- Notes for Temporary Traffic Signals.
- Temporary Traffic Signal Legend.
- Existing Equipment to be Removed Legend.
- Remove Existing Traffic Signal Equipment Notes.
- Existing and proposed geometrics.
- Existing traffic signal equipment.
- Temporary traffic signal equipment.
- Traffic Signal Equipment Data.
- Dimensioned pole locations.
- Pole guy wire locations.
- Lane width dimensions and ROW dimensioned from centerline of roadway.
- Distances from stop bars to opposite span wire mounted signals. 80' to 120' is a desirable distance but this distance can go up to 150' on larger intersections. Any distances beyond 150' need the approval of the County Engineer.
- Construction Notes (if necessary).

5. Temporary Cable Plan

When temporary traffic signals are required, the Temporary Cable Plan shall include:

- North arrow.
- Temporary Cable Plan.
- Temporary Phase Designation Diagram.
- Temporary Emergency Vehicle Preemption Sequence.
- Temporary Cable Plan Legend.
- Wattage Calculation Table.

6. Traffic Signal Installation or Modification Plan

The Traffic Signal Installation or Modification Plan shall include:

- North arrow and scale of 1" = 20'.
- Proposed geometrics.
- Proposed and existing (if applicable) traffic signal equipment and callouts.
- Construction Notes (if necessary).
- Traffic Signal Legend.
- Remove Existing Traffic Signal Equipment Notes (if no temporary traffic signal plans).
- Traffic Signal Equipment Data.
- Lane width dimensions and ROW dimensioned from centerline.
- Distances from stop bars to opposite mast arm mounted signals. 80' to 120' is a desirable distance but this distance can go up to 150' on larger intersections. Any distances beyond 150' need the approval of the County Traffic Engineer.
- Pedestrian sign types and locations.

7. Cable Plan, Schedule of Quantities & Phase Designation Diagram

The Cable Plan shall include:

- North arrow.
- Cable Plan.
- Phase Designation Diagram.
- Emergency Vehicle Preemption Sequence.
- Cable Plan Legend.
- Wattage Calculation Table.
- Schedule of Intersection Quantities.
- Estimated Cable Lengths in feet per electrical cable.

8. Interconnect Plan

The Interconnect Plan shall include:

- North arrow and scale of 1"=50'.
- Proposed geometrics.
- Proposed and existing (if applicable) traffic signal equipment and callouts.
- Construction Notes (if necessary).
- Interconnect Plan Legend.
- Traffic Signal Equipment Data.
- ROW dimensioned from centerline.

9. Interconnect Schematic and Schedule of Quantities

The Interconnect Schematic shall include:

- North arrow.
- Interconnect Schematic Legend.
- Schedule of Interconnect Quantities.
- Construction Notes (if necessary)

10. Other Sheets

- Video Detection Details Sheet – Shall show mounting details for video cameras (for either permanent or temporary signals), combination mast arm assembly and pole dimensions, and typical video vehicle detection system and/or video detection camera assignments for temporary traffic signals.
- Mast Arm Mounted Street Name Signs – Shall be included on every project that involves new mast arms. The MCDOT currently uses Clearview Highway fonts for all street name signs including mast arm mounted street name signs. In addition, all reflective sheeting used to manufacture mast arm mounted street names signs shall be full cube prismatic reflective sheeting, which conforms to proposed ASTM Type XI reflective sheeting.
- District One Standard Signal Design Details – Shall be included on every project.
- District One Typical Pavement Markings – Shall be included on every project that involves proposed pavement markings.

11. Specifications and Traffic Control and Protection

- The most recent version of the MCDOT Traffic Signal Specifications, including Traffic Control and Protection, shall be included with every submittal.
- Any additions to the Specifications must be approved by the County Traffic Engineer before approval of the plans is given.

12. Estimate of Cost

- An Engineer's Estimate of Cost shall be included with every submittal.
- The Estimate should be printed on 8 ½" x 11" sized paper.
- Estimate should include Coded Pay Item Number, Item Description, Unit Price and Total Price for each pay item shown on the Summary of Quantities. The total cost of the project should be shown at the end of the Estimate.
- Final Estimate should be signed and sealed by the Consulting Engineer.
- See Appendix C for example.

DESIGN GUIDELINES

1. Electric Service Installation

The designer shall contact the electric utility company regarding the electric service installation requirements or charges for the project. The County shall be copied on all written correspondence with the electric utility company. The name and phone number of the electric utility company representative shall be listed on the Cable Plan in the Wattage Calculation Table.

If a new electric service location is required for the project, the designer should meet with the representative of the electric utility company in the field to verify the proposed location for the electrical service.

If the total wattage for an existing traffic signal installation will be changing because of signal modifications, a copy of the new Wattage Calculation Table shall be sent to the electric utility company representative.

The cable for the electric service shall be brought into the cabinet foundation using a 2” conduit.

Either a Pole Mounted or a Ground Mounted Service Installation shall be specified for each new traffic signal.

2. Traffic Signal Heads

All new or modernized traffic signal installations shall utilize Light Emitting Diode (LED) signal heads. All traffic signal heads used in permanent signal installations shall be either bracket mounted or mast arm mounted and the material type shall not be specified. All signal heads shall have a yellow body with a black door.

All traffic signal sections shall have 12” lenses.

All mast arm mounted signal heads require louvered backplates.

3. Traffic Signal Head Placement

A minimum of three signal heads for through traffic shall be provided on the far side of the intersection.

At least one, and preferably two, of the signal faces required on the far side shall be located between two lines intersecting with the center of the approach lanes at the stop bar, one making an angle of approximately 20 degrees to the right of the center of the approach extended and the other making an angle of approximately 20 degrees to the left of center of the approach extended.

If Mast Arms are proposed, two of the signal heads shall be mounted on the mast arm.

If more than one through-lane exists for an approach, each mast arm mounted signal head shall be mounted in the center of the corresponding through-lane.

See Appendix B for additional guidance on traffic signal head placement for various lane configurations.

4. Pedestrian Signal Heads

All new pedestrian signal heads shall be 16" by 18" Light Emitting Diode (LED) signals. All signals shall provide a full overlay display of the international symbol for walk (walking person) and the international symbol for don't walk (raised paIm) on the left section, and a countdown timer on the right section. Existing pedestrian signal heads that utilize text ("Don't Walk"/'Walk") shall be removed and replaced. All pedestrian signal heads shall be bracket mounted.

5. Pedestrian Push-Buttons

Pedestrian push-buttons shall be placed next to sidewalks or at locations convenient to crosswalks, according to current "Americans with Disabilities Act" (ADA) standards. Each push-button shall be shown on the Plan on the side of the mast arm or post where it is to be installed. Each pushbutton should be accompanied by a 5" x 7" sign, and the sign and its location shall also be shown on the Plan. See the General Example in Appendix B for proper pushbutton and sign placement.

Two pushbuttons per corner shall be provided when two walk phases are available at that corner. The pushbuttons shall be mounted on separate posts/mast arms, and shall be a minimum of 10 feet apart.

6. Video Detection System (Complete Intersection)

The Video Detection System (Complete Intersection) shall be called for in the plans on all new traffic signal installations and on some traffic signal modernizations, except when State or Federal funding is involved. The use of video detection in these cases shall be determined by the County Engineer.

Video detection cameras should be shown on all County temporary traffic signals, and the cost of the Video Detection System shall be incidental to the cost of the temporary traffic signal.

When installed on a permanent traffic signal installation, combination mast arms shall be used, and the video detection camera shall be located on the luminaire arm of the combination mast arm assembly. When installed on a temporary traffic signal installation, the camera shall be located on the wood pole.

Detection zones should be shown on the plans when video detection cameras are used. The detection zone should be nearly as wide as the lane that it is in, and about 35' long, when located just behind the stop bar. When located at far-back detection areas, the zone should cover nearly the entire travel-way for the oncoming lanes and be about 12' long.

If pavement marking for a turn-lane (arrow and "ONLY") is located within a proposed detection zone, the pavement marking should be removed and relocated to 50' behind the stop bar.

7. Remote-Controlled Video System

The Remote-Controlled Video System (PTZ Camera) shall be called for in the plans on all new traffic signal installations and on some traffic signal modernizations, except when State or Federal funding is involved. The use of the PTZ Camera in these cases shall be determined by the County Traffic Engineer.

The PTZ Camera shall be shown on all County temporary traffic signals, unless otherwise directed by the County Traffic Engineer, and the cost of the Remote-Controlled Video System shall be incidental to the cost of the temporary traffic signal.

The PTZ Camera shall be installed on the pole of the combination mast arm assembly and pole, and should be located in the intersection quadrant that will provide the most visibility for both of the intersecting streets. The designer should field check the lines-of-sight to determine the best location for the PTZ Camera.

8. Inductive Loop Detection

On projects involving State or Federal funding, inductive loop detectors may be required. Please refer to IDOT District One's "Traffic Signal Design Guidelines" for guidance on inductive loop detector design.

On County projects where existing loop detectors are being replaced with video detection, the far back loops on each approach may be retained as sampling loops and shall be combined on one lead-in cable.

9. Emergency Vehicle Preemption Detection

Emergency Vehicle Preemption shall be installed for all new intersections, unless otherwise directed by the local agency. Under most conditions, a bi-directional light detector assembly will be adequate. Where mast arms are present, the detector shall be placed on the mast arm two feet to the right of the far left mast arm mounted signal. On intersection approaches which do not have mast arms, the designer shall field check the line-of-sight to determine the best location. Emergency vehicle light detectors must be mounted on 18-foot posts where mast arm mounting is not available. At larger intersections with dual left turn lanes, wide medians, and/or three through-lanes, the detectors should be split. A separate light detector will be required for each approach.

LED Confirmation beacons must be provided for each direction of emergency vehicle detection.

The designer shall ensure that appropriate pay items are included in the plans (i.e., LIGHT DETECTOR, LIGHT DETECTOR AMPLIFIER). The pay item LIGHT DETECTOR AMPLIFIER shall be paid for on a basis of one each per intersection controller and shall provide operation for all movements required in the preemption phase sequence.

10. Controllers

Actuated solid state digital controllers meeting the latest NEMA standards housed in a Type IV or Type V cabinet shall be specified for all new intersections, and where appropriate for modernized or modified intersections. The pay item "FULL-ACTUATED CONTROLLER AND TYPE IV (or V) CABINET" shall be specified for these intersections.

The pay item "FULL-ACTUATED CONTROLLER AND TYPE V CABINET" shall be specified for all intersections that include a local controller and master controller.

The designer will be responsible for ensuring controller and master controller compatibility with existing equipment in the vicinity of the proposed design. In addition, the designer will be responsible for keeping abreast of the District's approved signal system manufacturers and their limitations (i.e., maximum number of system loops per master, maximum number of system loops per local, maximum number of controllers per master, maximum number of system loops per local, maximum number of controllers per master, special telemetry requirements for large systems, etc.)

11. Signal Posts

Traffic signal posts shall be galvanized steel.

All traffic signal posts should be placed a minimum of four feet behind the back of a barrier curb, or, If barrier curb does not exist, the post should be placed a minimum of ten feet behind the edge of pavement or two feet behind the edge of shoulder, whichever distance is greater.

The following post heights should be used with bracket mounted traffic signal heads and other post mounted equipment:

- 3-Section Head – 16' post.
- 4-Section Head – 16' post.
- 5-Section Head – 16' post.
- Emergency Vehicle Preemption Light Detector – 18' post.
- Optically Programmed Signal Head – 18' post.
- Pedestrian Signal Head or Pushbutton only – 10' post.

12. Mast Arm Assemblies and Poles

Combination Mast Arm Assemblies and Poles shall be used at installations when video detection cameras are being installed.

All mast arm poles shall be located at a minimum of six feet behind the back of barrier curb, or, if barrier curb does not exist, the mast arm poles shall be located at a minimum of ten feet behind the edge of pavement or two feet behind the edge of shoulder, whichever distance is greater.

Steel mast arm poles shall be located to utilize a fourteen to fifty-five foot mast arm assembly. The mast arm lengths shall be in two foot, even increments up to fifty-four feet (i.e. – 14', 16', ... 52', 54', 55'). The outer traffic signal head on a steel mast arm assembly is to be placed two feet in from end of the mast arm.

Mounting heights and luminaire arm lengths for video detection cameras for combination steel mast arm assemblies and poles shall be according to the following requirements.

Mounting Heights and Arm Lengths for Combo Mast Arms:

1. 40’ mounting height, 20’ luminaire arm for 3 or 4 lane roadways (major direction of traffic).
2. 45’ mounting height, 20’ luminaire arm for 5 or more lane roadways (major direction of traffic).

Note: These are standard mast arms used by McHenry County. Situations may arise where these standard mast arms cannot be used or may be modified by the County Engineer as required.

13. Handholes

All handholes shall be cast in place utilizing IDOT Standards 814001 and 814006.

A double handhole shall be specified when eighteen or more cables enter a handhole and next to each controller cabinet.

A handhole is required when there is a change in direction of any conduit run that is 90° or more. Conduit runs with a change in direction of 90° or less, but that occur over a long distance (i.e., large radii) may not require a handhole.

Heavy-duty handholes shall be specified at all locations where vehicles could potentially drive over them, such as in the pavement or adjacent to shoulders.

Heavy-duty handholes shall only be designed in the pavement when it is necessary to service inside lane loops. Up to two lanes of detection can be serviced from a handhole outside the pavement area, and this is preferred to placing a heavy-duty handhole in the pavement. Heavy-duty double handholes are not allowed.

Interconnect handholes should be located as close to the right-of-way line as possible. Cross sections must be analyzed to ensure proper placement of interconnect handholes (i.e. outside drainage ditches).

The maximum spacing for interconnect handholes is 300 feet when copper conductor cable is used and 600 feet when fiber optic cable is used.

14. Conduit

All conduit shall be rigid galvanized steel with the exception of the low voltage detector raceway located between the pavement and adjacent handholes, which should utilize plastic unit duct.

All conduit shall be pushed under driveways and pavement (even if driveways are to be replaced or the pavement is to be reconstructed). All conduit must be placed a minimum of 30 inches below the finished grade.

The telephone service cable shall have its own conduit entering the controller foundation directly. If the telephone service cable will be routed through the double handhole adjacent to the controller foundation, it shall be installed in a one inch unit duct through the double handhole to reduce electrical interference from the electrical cables in the handhole.

The electrical service cable shall have its own conduit entering the controller foundation directly. The following conduit sizes shall be used:

LOCATION	SIZE
Entering a Combination Mast Arm Assembly and Pole	3”
Entering a regular Mast Arm	2 ½”
Entering a Signal Post	2 ½”
Telephone Service	2”
Electrical Service	2”
From Controller to Double Handhole	(2) 4”
All Roadway Crossings	4”
19 or more cables	(2) 4”
Ending at a Heavy-Duty Handhole servicing inside lane loops	2”
Entering the railroad cabinet	2”
Housing Interconnect cables only	2”
Unit duct	1”

CONDUIT ESTIMATION PROCEDURE

1. Find cable factor for each cable in conduit for which size is to be determined:

CABLE	FACTOR
#14, 2C	1.00
#14, 3C	1.08
#14, 5C	1.64
#14, 7C	1.80
Fiber Optic Cable, No. 62.5/125 24F	1.80
Fiber Optic Cable, No. 62.5/125 36F	2.00
#2, 2C	4.00
#4, 2C	3.00
#6, 2C	2.00
3 Pair, #18	1.64
6 Pair, #18	2.37
#20, 3C	0.50
#14, 1C	0.60
#10, 1C	0.50
#6, 1C	1.00
2-1C, #10	1.00
#16, 5 ½ Pair	1.80
#14, 3C, Railroad	1.08
Coaxial Cable	1.50

2. Add together the factors for all cable in the conduit.

3. Add 1.00 to the sum from Step 2 to get the Total.

4. Using the Total found in Step 3, find the conduit size using the chart below:

TOTAL		CONDUIT SIZE
New Signal Or Modify 40% Full	Add Pedestrian or Preemption 50% Full	
1.0 – 3.0	<3.750	1 ¼"
3.1 – 4.1	<5.125	1 ½"
4.2 – 6.8	<8.500	2"
6.9 – 9.7	<12.125	2 ½"
9.8 – 15.0	<18.750	3"
15.1 – 20.1	<25.125	3 ½"
20.2 – 25.9	<32.375	4"
26.0 – 40.7	<50.875	5"

5. Check conduit size found in Step 4 with the minimum sizes to be used for particular conditions and change to minimum size if size found in Step 4 is smaller.

CONDUIT	MINIMUM SIZE
Service Installation, Controller to RR Cabinet, Pedestrian Signal Post & Interconnect	2"
Signal Post or Regular Mast Arm Foundation	2 ½"
Combination Mast Arm Foundation	3"
Handhole to Controller & Main Conduit Crossings	4"

15. Electrical Cables

The following electrical cables shall be used:

ITEM	CABLE
3-Section Signal Head	No. 14, 5C
5-Section Signal Head	No. 14, 7C
Pedestrian Signal Head	No. 14, 3C
Pedestrian Pushbutton	No. 14, 2C
Video Detection Camera	No. 18, 3C
PTZ Camera	No. 14, 3C, No. 20, 3C & Coaxial Cable
Luminaire	600V (EPR-Type RHW) 2-1/C No. 10
Detector Loop	No. 14, 1 Pair Twisted, Shielded
Electric Service	No. 6, 2C
EVP Light Detector	No. 20, 3C, Twisted, Shielded
Confirmation Beacon	No. 14, 3C
L.E.D. Street Name Sign	No. 14, 2C
L.E.D. Blankout Sign	No. 14, 3C
Microwave Detector	No. 14, 2C
Railroad Interconnect	No. 14, 3C
Interconnect	24 Fiber, 12MM/12SM
Tracer Cable	No. 14, 1C

16. Electrical Cable Slack

The following slack and vertical lengths shall be used when calculating cable lengths:

ITEM	SLACK
Handhole	6.5’
Double Handhole	13’

ITEM	VERTICAL
Foundations	3.5’
Mast Arm Mounted Item	20’ + length on arm
Bracket Mounted Traffic or Pedestrian Signal Head	13’
L.E.D. Blankout Sign on Signal Post	18’
EVP on Signal Post	18’
Pedestrian Pushbutton	4’
Electric Service	13.5’
Luminaire	45’
Video Detection Camera	40’ or 45’
PTZ Camera	35’ or 40’

17. Foundations

The following foundation types and depths shall be used for concrete foundations:

ITEM	TYPE	DEPTH
Signal Posts	Type A	4’
Controller Cabinet with UPS attached	Type C	4’
Controller Cabinet	Type D	4’
Mast arms less than 30’ long	Type E (30”)	15’
Mast arms 30’ to 39’ long	Type E (36”)	15’
Mast arms 40’ to 55’ long	Type E (36”)	15’

**Mast arms greater than 55’ long, refer to IDOT Highway Standard 878001-06.

18. Temporary Traffic Signals

The installation of temporary traffic signals at locations with existing traffic signals is required in most cases where the existing signal equipment is being disrupted by construction or where the staging of traffic reduces visibility of the existing signals. These are not the only two cases where temporary signals may be required, though.

When existing traffic signal equipment is being only minimally disrupted and the designer feels that modifications to these signals can be accomplished without the use of temporary signals, the designer must first obtain approval from the County Traffic Engineer to proceed with a design that does not utilize temporary traffic signals.

The temporary traffic signal shall be designed to mimic the operation and phasing of the existing traffic signal, when present.

When designing temporary pole layout, the designer shall take into consideration existing and proposed geometrics, R.O.W. limits, construction staging, ground contours and drainage.

A minimum of three signal heads shall face traffic on each approach. One of these heads shall be a near right signal head. When protected only left-turn phasing is required, a minimum of five signal heads are required for that approach. Two signal heads shall be for the left turn movement, displaying red, yellow, and green left-turn arrows, and a "LEFT ON GREEN ARROW ONLY" sign shall be placed between these heads.

When temporary signals are being installed where there is an existing interconnect system, the designer shall ensure that this system is maintained during operation of the temporary signal.

Video Detection should be used for most temporary signals. The use of PTZ Cameras will be decided by the County Engineer on a case-by-case basis. Video detection cameras and PTZ cameras, when used, may be relocated from the existing traffic signal installation to the temporary traffic signal installation, or from the temporary traffic signal installation to the permanent traffic signal installation. When relocating cameras from the temporary traffic signal installation to the permanent signal installation, the designer shall ensure that the cameras meet the minimum requirements of the latest County specifications.

If Video Detection is not used, Microwave Detection should be used. The use of Microwave Detection will be directed by the County Engineer.

Controllers and Master Controllers may also be relocated from existing to temporary to permanent signals, but shall be decided by the County on a case-by-case basis. EVP equipment shall not be relocated to or from the temporary signal. EVP equipment may be relocated from the existing signal to the permanent signal, however.

Construction staging and associated traffic staging may require two or more temporary traffic signal designs. Two separate temporary signal designs (on two separate sheets) shall be required when different phasing, signal displays, and number of signal heads are required for each stage of construction.

If temporary pedestrian signal heads will be used, push-buttons shall be required.

19. Mast Arm Mounted Street Name Signs

Signs for street names should be provided on all mast arm poles. If a street has different names on each side of the intersection, two street name signs for each street name shall be provided. Each pair of signs, with the same name, shall be mounted back to back on the mast arm on the same side as the respective street names.

All street name sign designs shall be shown on the Mast Arm Mounted Street Name Sign sheet shown in Appendix C.

The first letter of each street name shall be 8-inch upper case, and each subsequent letter shall be 6-inch lower case. If the abbreviations for United States (US) or Illinois (ILL) are used, all letters for these shall be 8-inch upper case. The spacing between the words should be 6 inches, if possible, but may be reduced to 5 inches when spacing is critical. A minimum of 2½ inches shall be included between the word and the right and left edges of the sign. Sign lengths are in 6-inch increments.

The preferred method for the sign design is to use Series D lettering for the street name on a one-line sign. If Series D lettering for the street name does not fit on a one-line sign, then Series C lettering should be used on a one-line sign. If Series C lettering for the street name does not fit on a

one-line sign, a two-line sign can be used. The crossroad designation as to Street, Avenue, etc., should be spelled out on the second line, if there is space available.

The following abbreviations and lengths shall be used:

ABBREVIATION		SERIES D	SERIES C
Av	(Avenue)	12 4/8	10 0/8
Blvd	(Boulevard)	19 3/8	18 0/8
Ct	(Court)	10 1/8	8 4/8
Cir	(Circle)	14 3/8	12 4/8
Dr	(Drive)	10 6/8	9 1/8
Hwy	(Highway)	20 5/8	17 1/8
Ln	(Lane)	11 0/8	9 3/8
Pkwy	(Parkway)	26 7/8	21 0/8
Pl	(Place)	8 1/8	7 0/8
Rd	(Road)	11 2/8	9 4/8
St	(Street)	10 1/8	8 4/8
Ter	(Terrace)	15 4/8	13 2/8
Tr	(Trail)	10 0/8	8 4/8
US	(United States)	12 2/8	10 1/8
ILL	(Illinois)	14 2/8	12 1/8

Currently, the County uses ClearviewHwy Fonts for all mast arm mounted street name signs. Series C fonts shall be replaced with ClearviewHwy Series 2-W fonts and Series D fonts shall be replaced with ClearviewHwy Series 3-W fonts.

20. Pavement Marking

All designers shall adhere to the IDOT District 1 Typical Pavement Marking Details included in Appendix C. Thermoplastic pavement marking shall be specified for all bituminous pavement. Pre-formed plastic pavement marking shall be specified for all concrete pavement. Alternative forms of pavement markings may also be required depending on type of project.

21. Sidewalk

All sidewalks removed for construction purposes shall be replaced. Sidewalk landings and depressed curb ramps accessible to the disabled shall be placed at crosswalk locations in conformance with ADA Standards and should be shown on the Traffic Signal Installation/Modification sheet.

22. Street Lighting

Luminaires shall be installed for all new traffic signal installations and for some temporary traffic signals, to be determined by the County on a case-by-case basis.

If used, all luminaires shall have a manufacturer recommended house side shield installed.

If federal or state funding is involved in the project, luminaires may not be required. This shall be decided on a case-by-case basis by the County Engineer.

The pay items and plan symbology used by the County for street lighting are shown in Appendix C.

23. Traffic Control & Protection

Pay items for Traffic Control and Protection shall be included in every project. The designer shall be responsible for reviewing the traffic control and protection standards developed by IDOT for typical applications, and only those standards that are applicable to the project should be used. On roadway design projects, the traffic signal designer shall coordinate with the roadway designer with respect to the traffic control and protection pay items and standards that are specified for the project.

24. System Grounding of Traffic Signal Equipment

New permanent traffic signal installations shall include grounding. Traffic signal modifications or modernizations shall have grounding installed for any new post, mast arm or controller foundation, as long as the controller foundation is grounded.

A continuous equipment grounding conductor (NO. 6 1C) shall be installed in all conduits that contain traffic signal cabling, except conduits that contain only detector loop lead-in cable or only interconnect cable. The equipment grounding conductor is paid for Electric Cable in Conduit, Grounding NO. 6 1C.

The equipment grounding conductor and associated ground rods shall be shown on the Cable Plan. Ground rods are required for all post, controller, and mast arm foundations. The ground rods are included in the cost of the foundation.

25. Traffic Signal Interconnect Systems

All new or modernized closed loop traffic signal systems shall utilize 24 fiber optic cable, 12 fibers shall be multimode and 12 fibers shall be single mode.

A separate transceiver is required for each new controller that is being installed in an interconnected system.

For existing systems that are being expanded or modernized, the designer shall determine if the existing master controller is capable of accommodating the additional intersection(s). Depending on the size and configuration of the existing signal system, it may be necessary to provide an additional telemetry channel(s) in the master controller.

A tracer cable, No. 14 1C, shall be installed with the fiber optic interconnect cable.

26. Railroad Coordination/Preemption

The designer should always contact MCDOT and request a meeting prior to beginning a design involving a railroad crossing within 200 feet of a traffic signal and/or when the existing or projected vehicular queue will extend beyond the crossing. Consideration must first be given to whether railroad preemption is required. This determination shall be made based on current County traffic signal design criteria, guidelines contained in the Institute of Transportation Engineers (ITE) publication “Preemption of Traffic Signals at or Near Railroad Grade Crossings with Active Warning Devices,” and Illinois Commerce Commission (ICC) recommendations. An evaluation must be made of the probability of vehicles queuing onto the tracks during normal signal operation.

Based on the distance between the railroad tracks and the cross street, pre-signals may be required. The preferred mounting location for the pre-signals is on the railroad cantilever, if present. The structural adequacy of the cantilever must be evaluated to determine if the cantilever is capable of accommodating the pre-signal.

The design shall incorporate internally illuminated LED left-turn and right-turn restriction signs. Two signs that display the international turn restriction shall be included for each turning movement to be restricted. If the signs are mounted on a post, the posts shall be at least one foot tall. These signs are not required for protected only left turn movements.

A phone drop must be included to the traffic signal controller cabinet unless the traffic signal installation is part of a signal system.

When a project involves work adjacent to a railroad, pay items for “Railroad Protective Liability Insurance” and “Right of Entry Permit” shall be included in the plans.

Please refer to IDOT District One’s “Traffic Signal Design Guidelines” for further guidance on the design of traffic signals in close proximity to railroad grade crossings.

APPENDIX A

LEGENDS

NOTES FOR TEMPORARY TRAFFIC SIGNALS

1. ALL CONTROL EQUIPMENT INCLUDING EMERGENCY PRE-EMPTION AND COMMUNICATION DEVICES FOR THE TEMPORARY TRAFFIC SIGNAL(S) SHALL BE FURNISHED BY THE CONTRACTOR.

2. ONLY ECONOLITE CONTROLLERS SUPPLIED BY ONE OF THE COUNTY APPROVED CLOSED LOOP EQUIPMENT MANUFACTURERS WILL BE APPROVED FOR USE AT TEMPORARY SIGNAL LOCATIONS. ALL CONTROLLERS USED FOR TEMPORARY TRAFFIC SIGNALS SHALL BE FULLY-ACTUATED NEMA MICROPROCESSOR BASED WITH RS232 DATA ENTRY PORTS COM-PATIBLE WITH EXISTING MONITORING SOFTWARE APPROVED BY THE COUNTY INSTALLED IN A NEMA TS1 OR TS2 CABINET.

3. ALL TRAFFIC SIGNAL SECTIONS AND PEDESTRIAN SIGNAL SECTIONS SHALL BE 12". HEADS AND SHALL BE PLACED AS INDICATED ON THE TEMPORARY TRAFFIC SIGNAL PLAN OR AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL FURNISH ENOUGH CABLE SLACK TO RELOCATE HEADS TO ANY POSITION ON THE SPAN WIRE FOR CONSTRUCTION STAGING. THE TEMPORARY TRAFFIC SIGNAL SHALL REMAIN IN OPERATION DURING ALL SIGNAL HEAD RELOCATIONS. EACH TEMPORARY TRAFFIC SIGNAL HEAD SHALL HAVE ITS OWN CABLE FROM THE CONTROLLER CABINET TO THE SIGNAL HEAD.

4. ALL EXISTING STREET NAME AND INTERSECTION REGULATORY SIGNS SHALL BE REMOVED FROM EXISTING POLES, RELOCATED, AND SECURELY FASTENED TO THE SIGNAL SPAN WIRE OR WOOD POLE AS DIRECTED BY THE ENGINEER.

5. ANY TEMPORARY SIGNAL WITHIN AN EXISTING CLOSED LOOP TRAFFIC SIGNAL SYSTEM SHALL BE INTERCONNECTED TO THAT SYSTEM. ANY TEMPORARY TRAFFIC SIGNAL WITHIN AN ICONS SYSTEM SHALL BE NTCIP COMPATIBLE AND SHALL BE INTERCONNECTED TO THAT SYSTEM.

6. IF NO TRAFFIC STAGING IS IN PLACE OR WILL NOT BE STAGED ON THE DAY OF THE TURN-ON, THE TEMPORARY TRAFFIC SIGNAL SHALL HAVE THE SIGNAL HEAD DISPLAYS, SIGNAL HEAD PLACEMENTS, AND CONTROLLER PHASING MATCH THE EXISTING TRAFFIC SIGNAL AT THE TIME OF THE TURN-ON.

REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT EACH 1

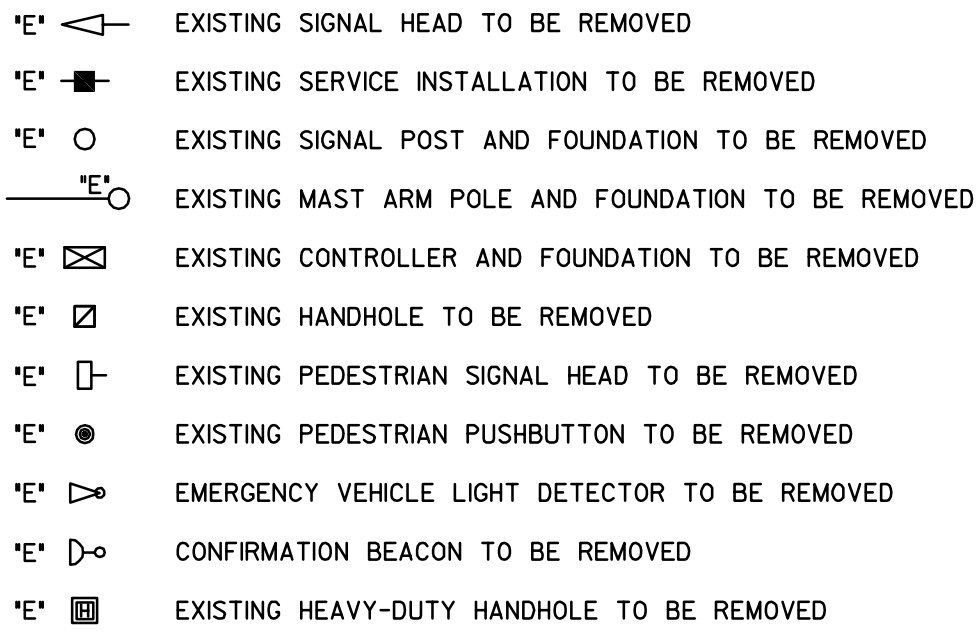
THE FOLLOWING EXISTING TRAFFIC SIGNAL EQUIPMENT SHALL BE REMOVED BY THE CONTRACTOR, SHALL REMAIN THE PROPERTY OF THE COUNTY AND SHALL BE DELIVERED BY THE CONTRACTOR TO THE COUNTY YARD AS PER THE TRAFFIC SIGNAL SPECIFICATIONS OR AS DIRECTED BY THE COUNTY TRAFFIC ENGINEER.

THE FOLLOWING EXISTING TRAFFIC SIGNAL EQUIPMENT SHALL BE REMOVED BY THE CONTRACTOR AND SHALL REMAIN THE PROPERTY OF THE AGENCY LISTED BELOW. THE CONTRACTOR SHALL SAFELY STORE AND ARRANGE FOR PICK UP OR DELIVERY OF ALL EQUIPMENT TO BE RETURNED TO THE LISTED AGENCY AS PER THE TRAFFIC SIGNAL SPECIFICATIONS.

AGENCY:

THE FOLLOWING ITEMS SHALL BE REMOVED BY THE CONTRACTOR AND SHALL BE DISPOSED OF BY THEM OUTSIDE THE RIGHT-OF-WAY AT THEIR EXPENSE. THE SALVAGE VALUE OF THE REMOVED EQUIPMENT SHALL BE REFLECTED IN THE CONTRACT BID PRICE.

EXISTING EQUIPMENT TO BE REMOVED LEGEND



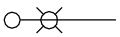
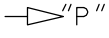
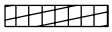
TEMPORARY TRAFFIC SIGNAL LEGEND

	TEMPORARY TRAFFIC SIGNAL HEAD SPAN WIRE MOUNTED ORIGINAL LOCATION
	TEMPORARY TRAFFIC SIGNAL HEAD SPAN WIRE MOUNTED SECONDARY LOCATION
	TEMPORARY WOOD POLE (CLASS 5 OR BETTER) 45 FOOT MINIMUM
	TEMPORARY CONTROLLER CABINET
	TEMPORARY SPAN WIRE, TETHER WIRE, AND CABLE
	TEMPORARY SERVICE INSTALLATION
	TEMPORARY PEDESTRIAN SIGNAL HEAD, BRACKET MOUNTED
	VIDEO DETECTION CAMERA
	PTZ CAMERA
	PEDESTRIAN PUSHBUTTON DETECTOR
	EMERGENCY VEHICLE LIGHT DETECTOR
	CONFIRMATION BEACON
	VEHICLE DETECTOR, INDUCTION LOOP
UD	UNIT DUCT
	G.S. CONDUIT, PUSHED (P) OR TRENCHED (T)
	HANDHOLE
	HEAVY DUTY HANDHOLE
	MICROWAVE DETECTOR

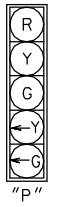
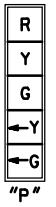
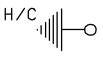
TEMPORARY CABLE PLAN LEGEND

R	TEMPORARY TRAFFIC SIGNAL SECTION OR PEDESTRIAN SIGNAL SECTION 12"
	TEMPORARY CONTROLLER CABINET
	TEMPORARY SERVICE INSTALLATION
5	INDICATES NUMBER OF CONDUCTORS IN CABLE. ALL CONDUCTORS TO BE NUMBER 14 AWG WIRE UNLESS OTHERWISE NOTED.
	EMERGENCY VEHICLE LIGHT DETECTOR
	CONFIRMATION BEACON
	VEHICLE DETECTOR, INDUCTION LOOP
	PEDESTRIAN PUSHBUTTON DETECTOR
00	PEDESTRIAN SIGNAL HEAD
	VIDEO DETECTION CAMERA
	PTZ CAMERA
	LUMINAIRE
T	TELEPHONE DROP
	MICROWAVE DETECTOR

TRAFFIC SIGNAL LEGEND

	PROPOSED	EXISTING
CONTROLLER		
SERVICE INSTALLATION		
SIGNAL HEAD		
SIGNAL HEAD WITH BACKPLATE		
SIGNAL HEAD, PEDESTRIAN		
SIGNAL POST		
MAST ARM ASSEMBLY AND POLE, STEEL		
MAST ARM ASSEMBLY AND POLE, ALUMINUM		
COMBINATION MAST ARM ASSEMBLY AND POLE, STEEL, WITH LUMINAIRE		
UNIT DUCT	UD	
CONDUIT SPLICE		
HANDHOLE		
HEAVY DUTY HANDHOLE		
DOUBLE HANDHOLE		
G.S. CONDUIT, PUSHED (P) OR TRENCHED (T)		
PEDESTRIAN PUSHBUTTON DETECTOR		
PEDESTRIAN PUSHBUTTON SIGN		
DETECTOR LOOP		
EMERGENCY VEHICLE LIGHT DETECTOR		
CONFIRMATION BEACON		
SIGNAL HEAD OPTICALLY PROGRAMMED	 "P"	 "P"
RAILROAD CONTROL CABINET		 "E"
VIDEO DETECTION CAMERA		
APPROXIMATE DETECTION ZONE		
PTZ CAMERA		
STREET NAME SIGN		
ABANDON	"A"	
COMBINATION CURB AND GUTTER REMOVAL AND COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24 (DEPRESSED CURB)		
P.C.C. SIDEWALK 5"		
BITUMINOUS SHOULDER REMOVAL AND P.C.C. SIDEWALK, 5"		
VIDEO COMMUNICATIONS CABINET		 "E"
TELEPHONE DROP		
UNINTERRUPTIBLE POWER SUPPLY		

CABLE PLAN LEGEND

EXISTING	PROPOSED	
		12" TRAFFIC SIGNAL SECTION
		12" PEDESTRIAN SIGNAL SECTION
		16"x18" PEDESTRIAN SIGNAL HEAD WITH COUNTDOWN TIMER
		CONTROLLER CABINET
		SERVICE INSTALLATION
		TELEPHONE INSTALLATION
		VEHICLE DETECTOR, INDUCTION LOOP
		EMERGENCY VEHICLE LIGHT DETECTOR
		CONFIRMATION BEACON
		PUSHBUTTON DETECTOR
		DENOTES NUMBER OF CONDUCTORS. ALL CABLE NO. 14 EXCEPT AS INDICATED. ALL LOOP DETECTOR CABLE TO BE SHIELDED.
		GROUND CABLE IN CONDUIT NO. 6 SOLID COPPER (GREEN)
		FIBER OPTIC CABLE IN CONDUIT NO. 62.5/125 2-MM12F SM12F
 "P"	 "P"	SIGNAL FACE WITH BACKPLATE. "P" INDICATES PROGRAMMED HEAD.
"E" 		RAILROAD CONTROL CABINET
"E" 		ILLUMINATED SIGN "NO LEFT TURN"
"E" 		ILLUMINATED SIGN "NO RIGHT TURN"
H/C 	C 	GROUND ROD AT HANDHOLE (H), DOUBLE HANDHOLE (H), OR CONTROLLER (C)
P 	P 	GROUND ROD AT POST (P) OR MAST ARM POLE (MA)
S 	S 	GROUND ROD AT ELECTRIC SERVICE INSTALLATION
		LUMINAIRE
		VIDEO DETECTION CAMERA
		PTZ CAMERA
"E" 		VIDEO COMMUNICATIONS CABINET
		TELEPHONE DROP
ST. NAME	ST. NAME	L.E.D. STREET NAME SIGN

INTERCONNECT PLAN LEGEND

	PROPOSED	EXISTING
CONTROLLER CABINET		
VIDEO COMMUNICATIONS CABINET		
HANDHOLE		
DOUBLE HANDHOLE		
HEAVY-DUTY HANDHOLE		
G.S. CONDUIT, PUSHED (P) OR TRENCHED (T)		
DETECTOR LOOP		
SYSTEM	S	
INTERSECTION	IP	I
UNIT DUCT	UD	

INTERCONNECT SCHEMATIC LEGEND


INTERSECTION CONTROLLER

VIDEO COMMUNICATIONS CABINET


EXISTING INTERSECTION CONTROLLER

MASTER CONTROLLER

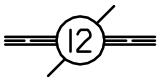
EXISTING MASTER CONTROLLER


PROPOSED INTERSECTION AND
SAMPLING (SYSTEM) DETECTOR


SAMPLING (SYSTEM) DETECTOR

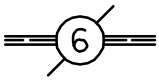
PROPOSED INTERCONNECT CABLE NO. 62.5/125
24F MULTIMODE AND 12F SINGLE MODE

PROPOSED INTERCONNECT CABLE NO. 62.5/125
12F MULTIMODE AND 12F SINGLE MODE



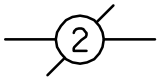
EXISTING INTERCONNECT CABLE
NO. 62.5/125 12C FIBER OPTIC CABLE

PROPOSED INTERCONNECT CABLE NO. 18, 3 PAIR
TWISTED, SHIELDED

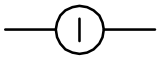


EXISTING INTERCONNECT CABLE NO. 18, 3 PAIR
TWISTED, SHIELDED

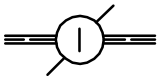
PROPOSED LOOP DETECTOR CABLE
2/C TWISTED, SHIELDED



EXISTING LOOP DETECTOR CABLE
2/C TWISTED, SHIELDED



PROPOSED TRACER CABLE
NO. 14 1/C



EXISTING TRACER CABLE
NO. 14 1/C

EXISTING TELEPHONE CONNECTION

PROPOSED TELEPHONE CONNECTION

PROPOSED ISDN CONNECTION

WATTAGE CALCULATION TABLE

MCDOT TRAFFIC SIGNAL INSTALLATION ELECTRICAL SERVICE REQUIREMENTS					TOTAL WATTAGE
TYPE	NO. OF LAMPS	WATTAGE x INCAND.	LED	x % OPERATION	
SIGNAL (RED)	12	135	10	0.50	60.0
(YELLOW)	12	135	19	0.10	22.8
(GREEN)	12	135	11	0.40	52.8
ARROW	8	135	9	0.10	7.2
PED. SIGNAL	4	90	9	1.00	36.0
CONTROLLER	1	-	300	1.00	300.0
LUMINAIRE	2	-	250	0.50	250.0

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ENERGY COSTS TO:				TOTAL =	728.8

STATE, COUNTY, MUNICIPALITY
OR PRIVATE AGENCY

STREET ADDRESS
CITY, ILLINOIS ZIP

ENERGY SUPPLY: CONTACT: COMED REPRESENTATIVE
PHONE: (XXX) XXX-XXXX
COMPANY: COMED

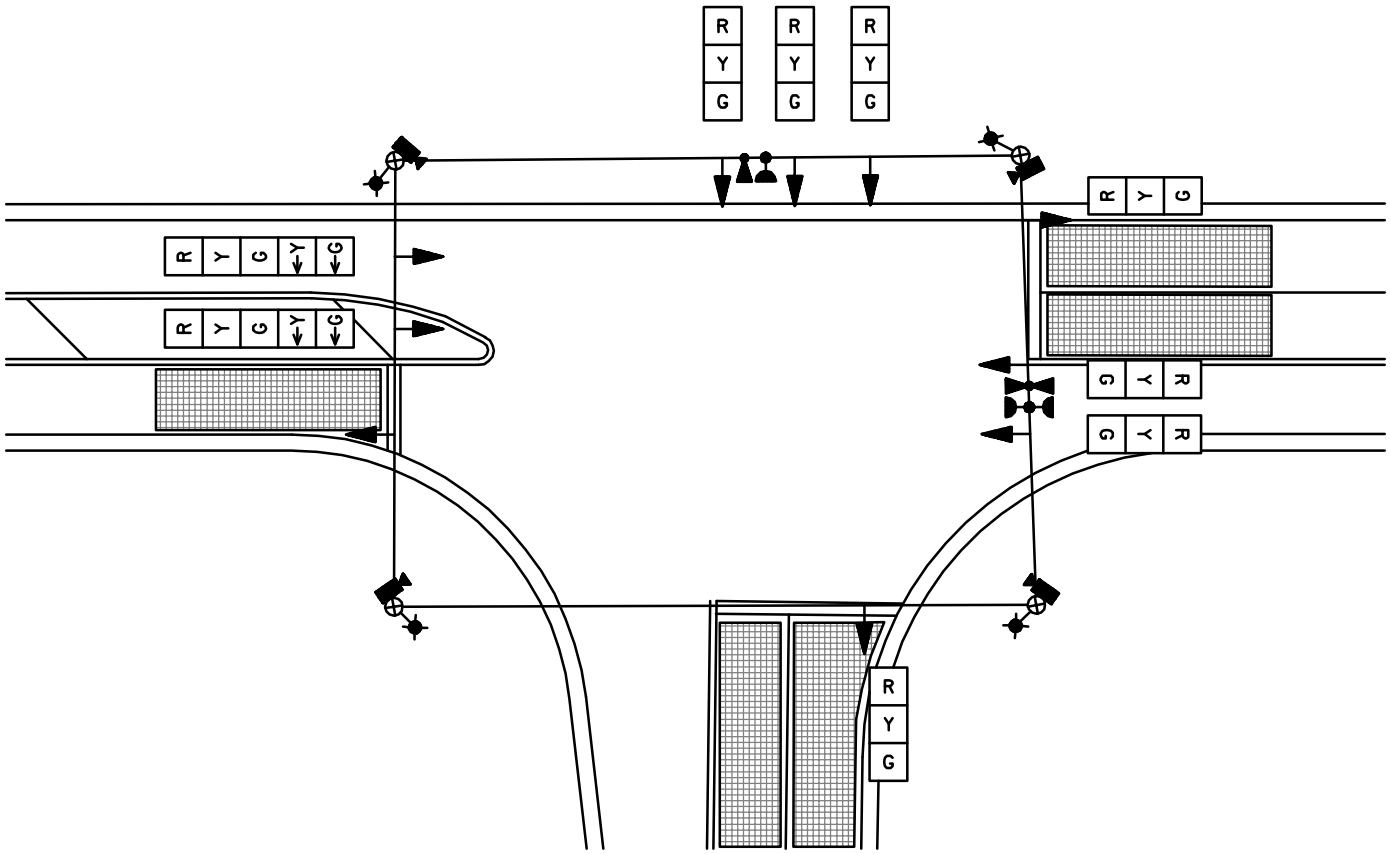
FOUNDATION (DEPTH)	FT.	CABLE SLACK	FT.	VERTICAL	FT.
TYPE A - POST	4	HANDHOLE	6.5	ALL FOUNDATIONS	3.5
C - CONT. W/ UPS	4	DOUBLE HANDHOLE	13	MAST ARM (L) POLE	20'+
D - CONTROLLER	4	SIGNAL POST	2		L-2=
E - M. ARM POLE	15	CONTROLLER CAB.	1	BRACKET MOUNTED	13
		FIBER OPTIC	13	PED. PUSHBUTTON	4
		ELECTRIC SERVICE	1	ELECTRIC SERVICE	13.5
		GROUND CABLE	1	SERVICE TO GROUND	13.5
				POST MOUNTED	6

APPENDIX B

INTERSECTION DESIGN EXAMPLES

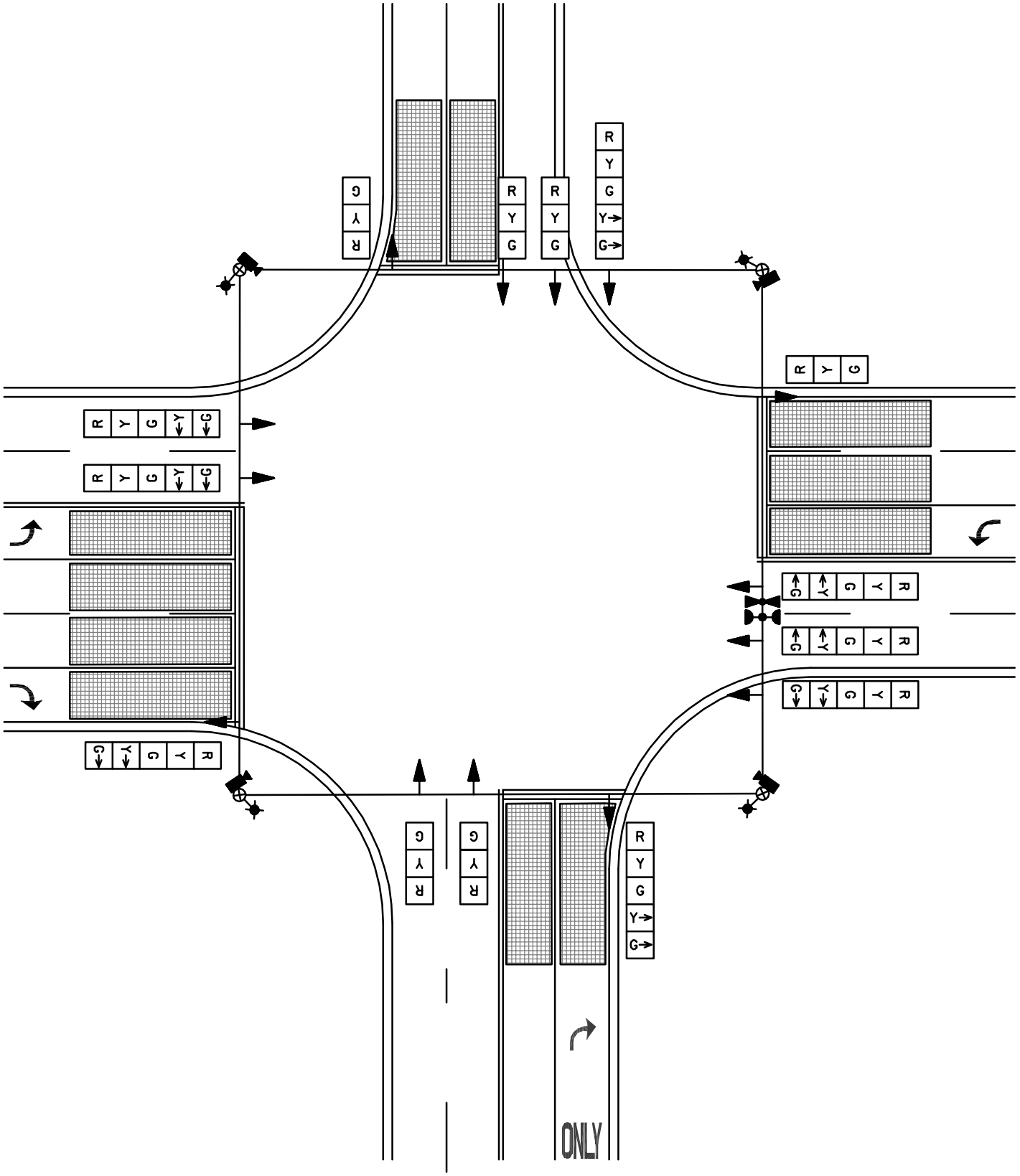
TEMPORARY SIGNAL PLAN #1

"T" INTERSECTION W/O PEDESTRIAN CROSSINGS



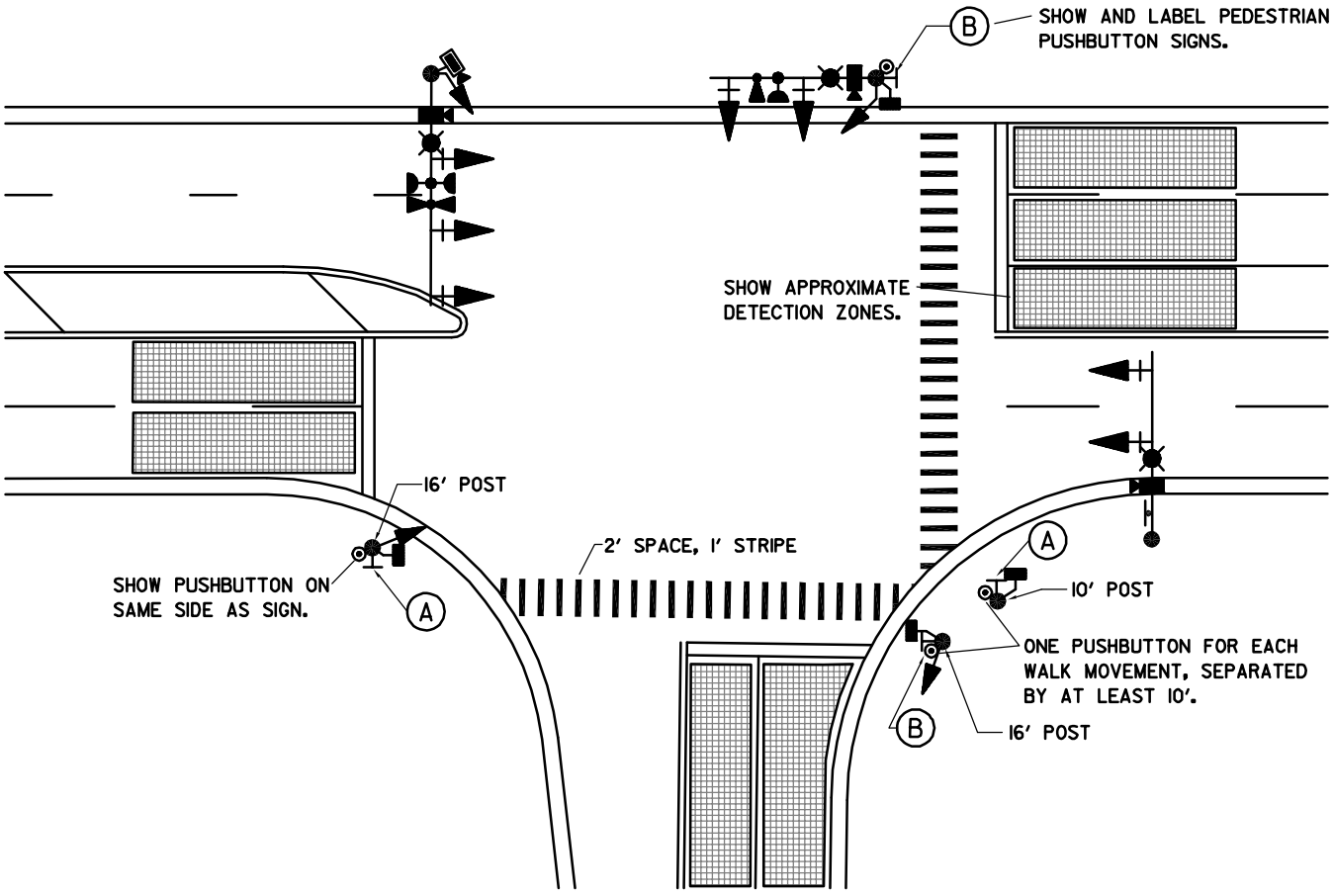
TEMPORARY SIGNAL PLAN *2

FOUR-LEGGED INTERSECTION W/O PEDESTRIAN CROSSINGS

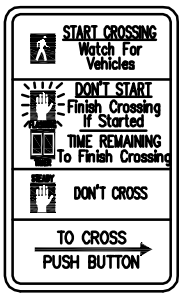


SIGNAL PLAN #1

GENERAL GUIDELINES

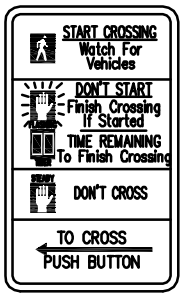


SIGN (A)



R10-3e
2 REQUIRED
(INCIDENTAL TO CONTRACT)

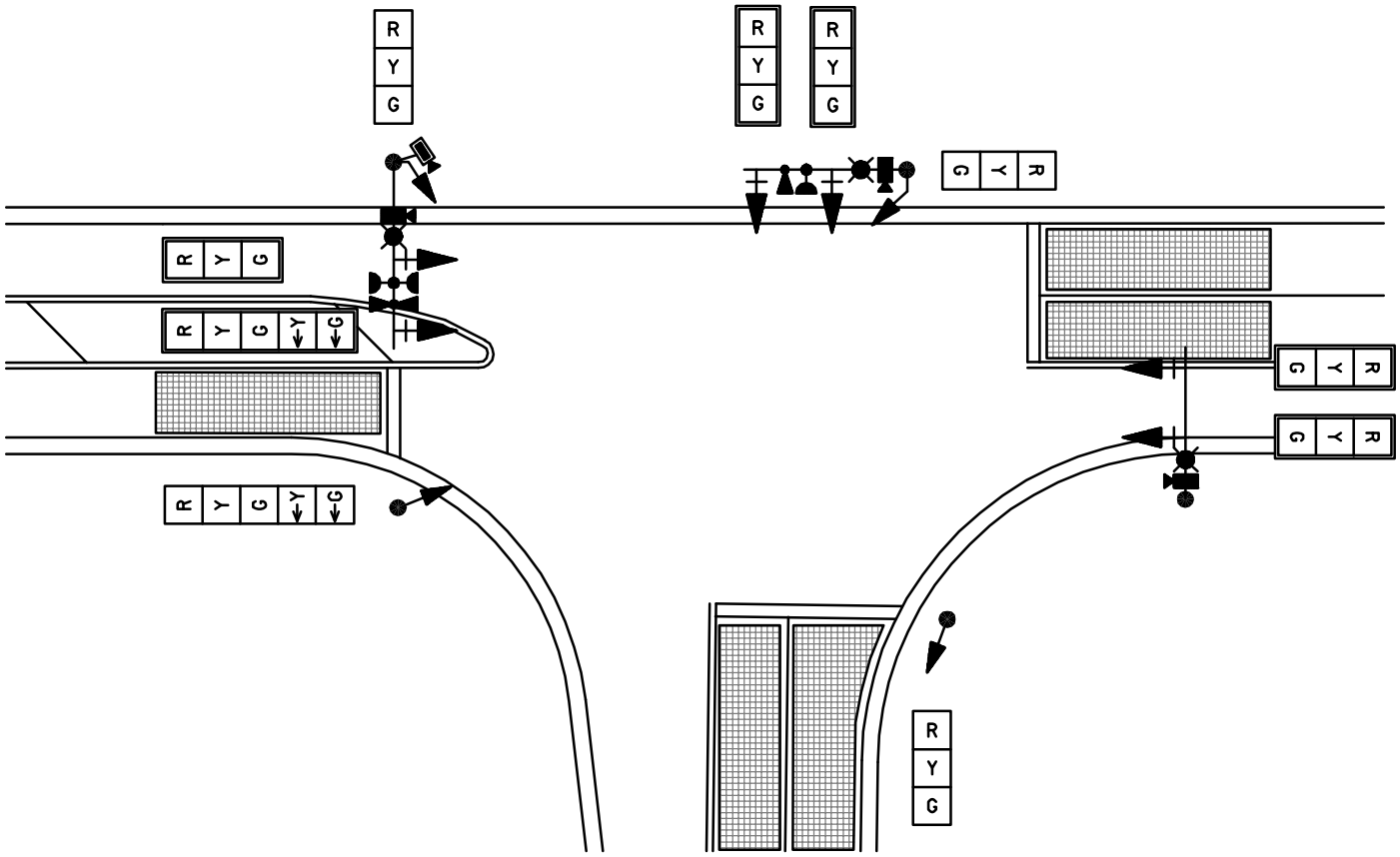
SIGN (B)



R10-3e
2 REQUIRED
(INCIDENTAL TO CONTRACT)

SIGNAL PLAN #2

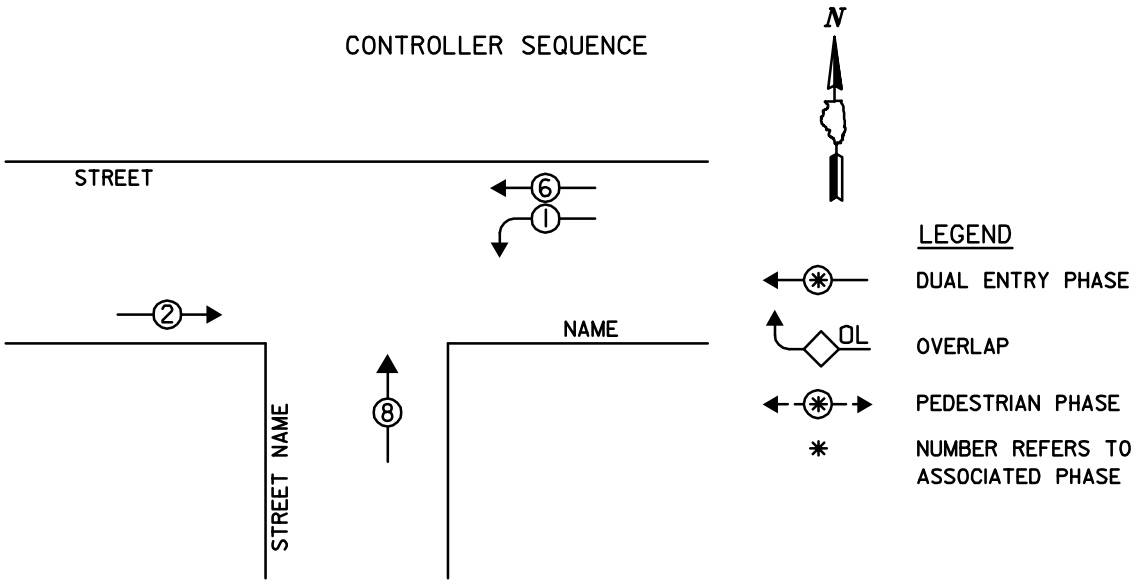
"T" INTERSECTION W/O PEDESTRIAN CROSSINGS

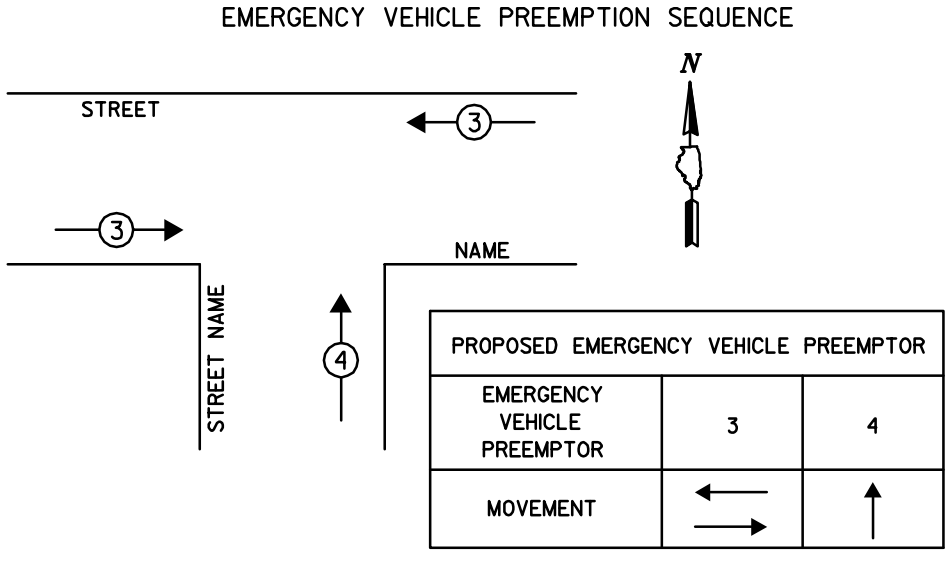


SEE SIGNAL PLAN #1 FOR GENERAL GUIDELINES.

PHASE DIAGRAMS #2

"T" INTERSECTION W/O PEDESTRIAN CROSSINGS

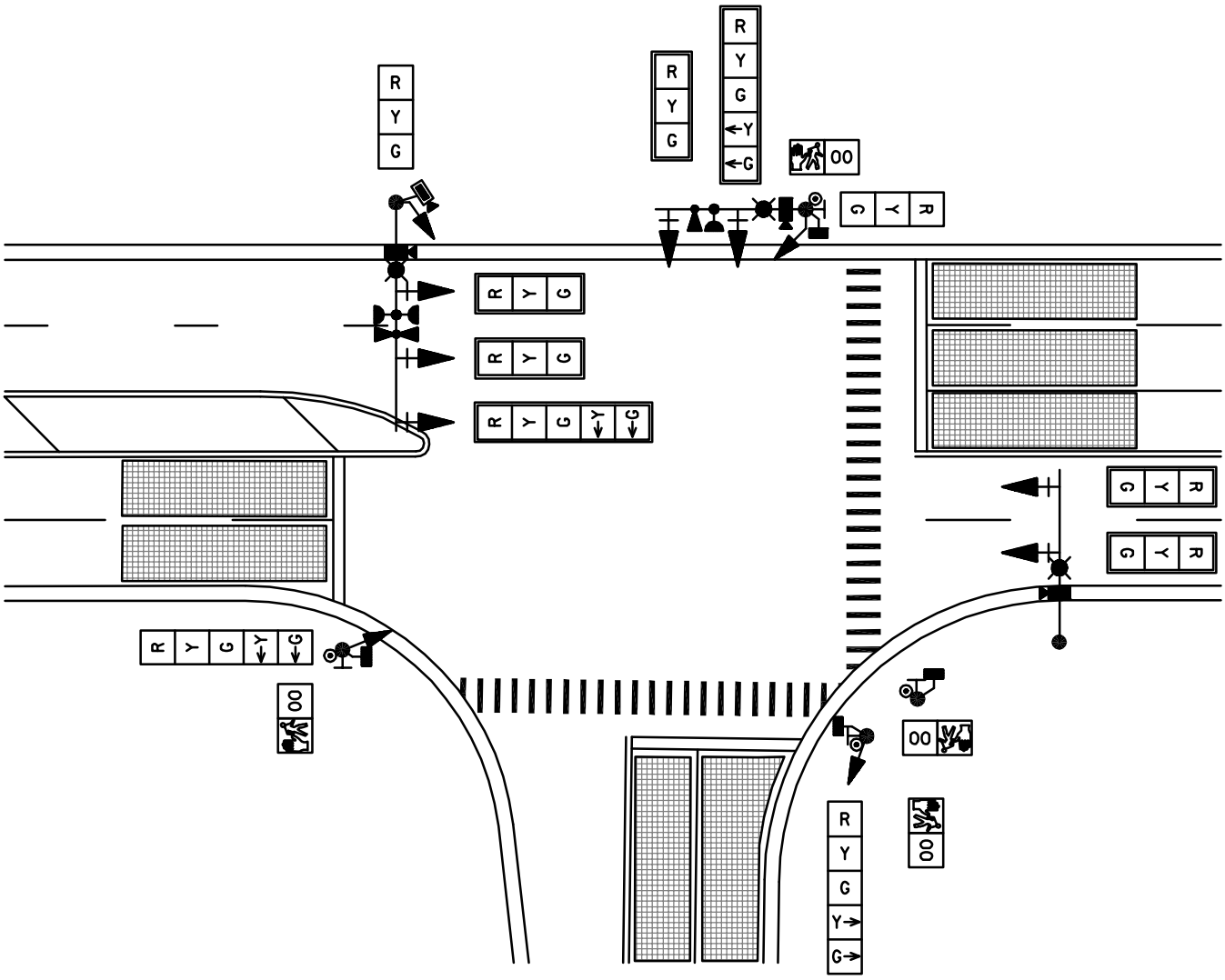




PROPOSED EMERGENCY VEHICLE PREEMPTOR		
EMERGENCY VEHICLE PREEMPTOR	3	4
MOVEMENT	← →	↑

SIGNAL PLAN #3

"T" INTERSECTION WITH PEDESTRIAN CROSSINGS

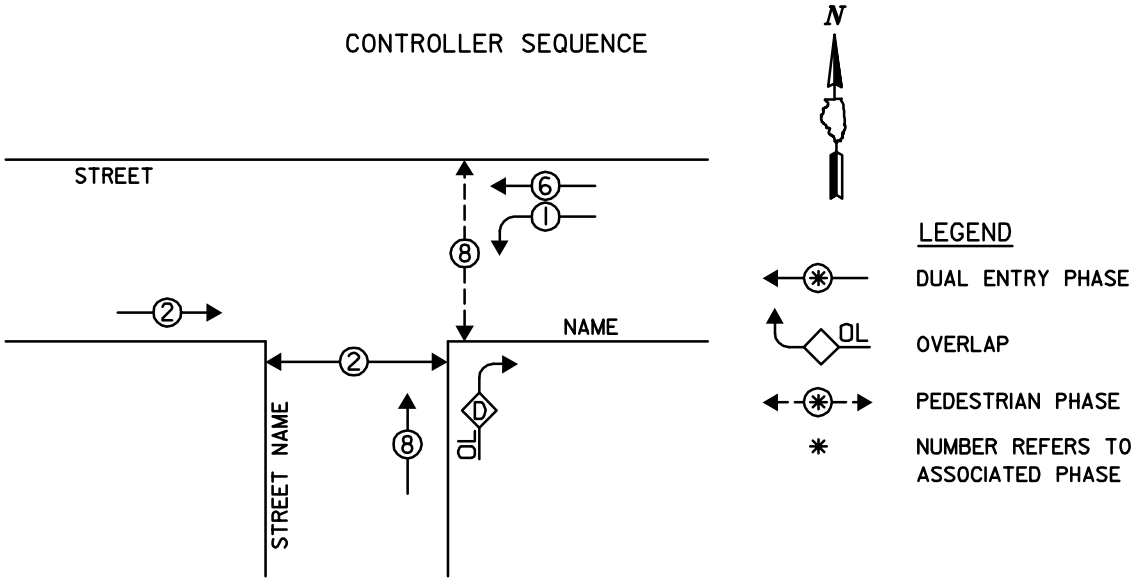


SEE SIGNAL PLAN #1 FOR GENERAL GUIDELINES.

PHASE DIAGRAMS #3

"T" INTERSECTION WITH PEDESTRIAN CROSSINGS

CONTROLLER SEQUENCE

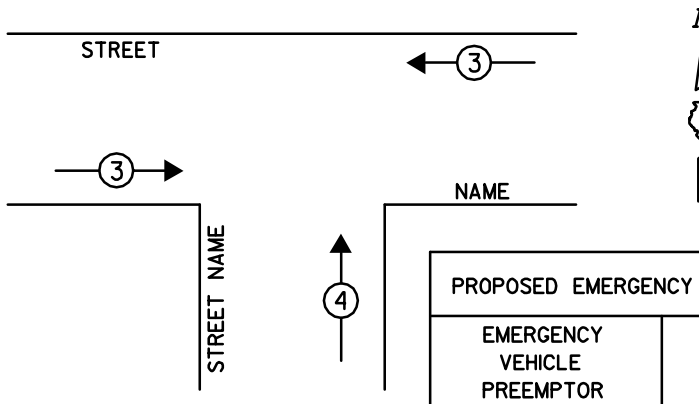


PHASE DESIGNATION DIAGRAM

RIGHT TURN OVERLAP PHASE DESIGNATION

OVERLAP LETTER		PERMISSIVE PHASE		PROTECTED PHASE
D	=	8	+	1

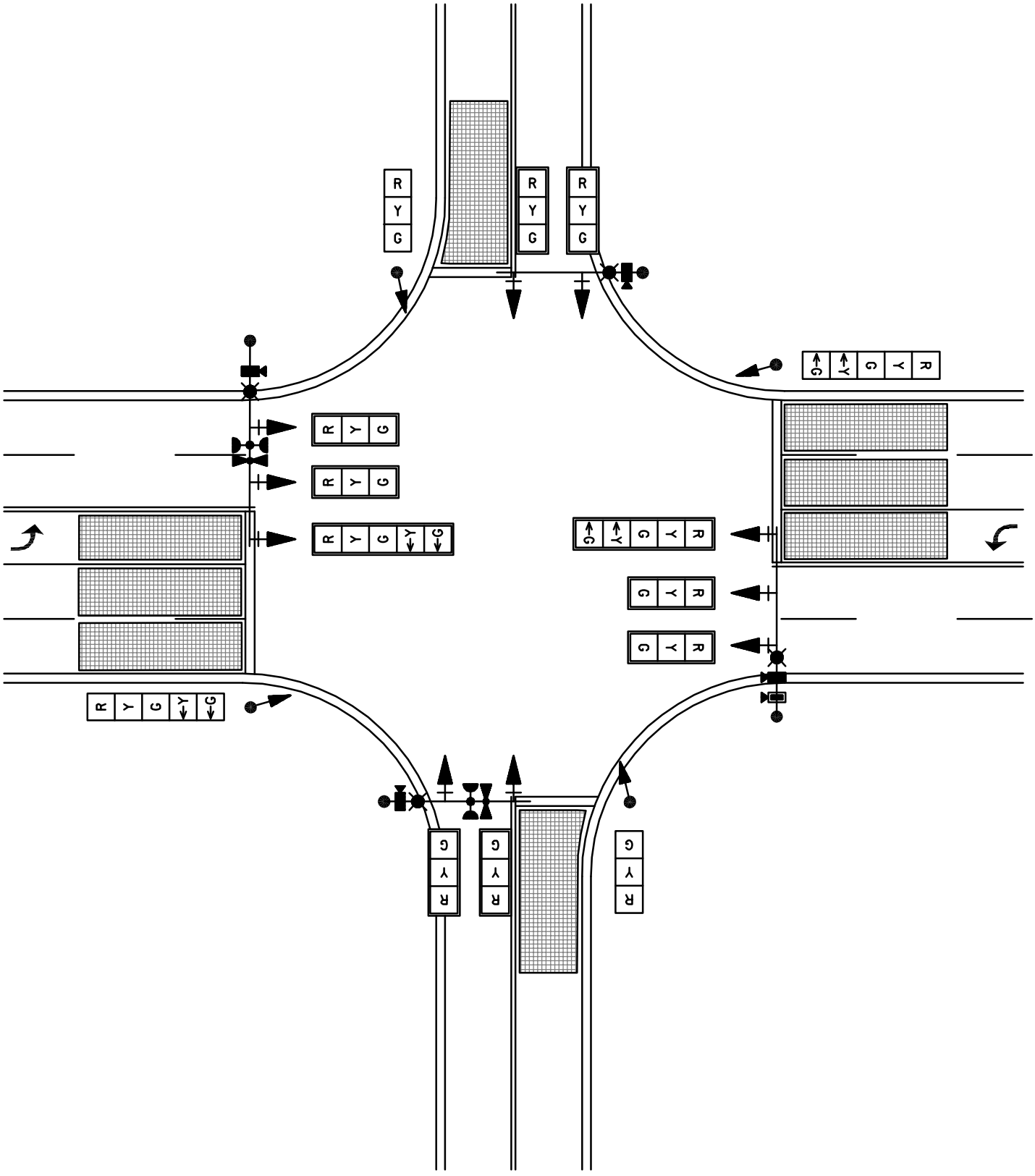
EMERGENCY VEHICLE PREEMPTION SEQUENCE



PROPOSED EMERGENCY VEHICLE PREEMPTOR		
EMERGENCY VEHICLE PREEMPTOR	3	4
MOVEMENT	← →	↑

SIGNAL PLAN #4

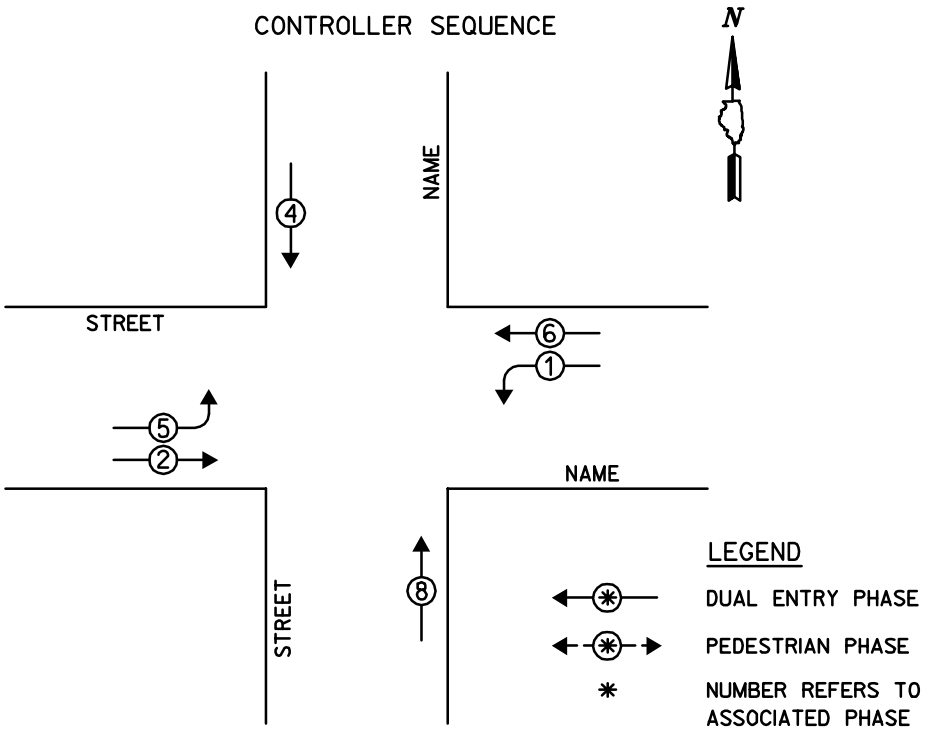
FOUR-LEGGED INTERSECTION W/O PEDESTRIAN CROSSINGS



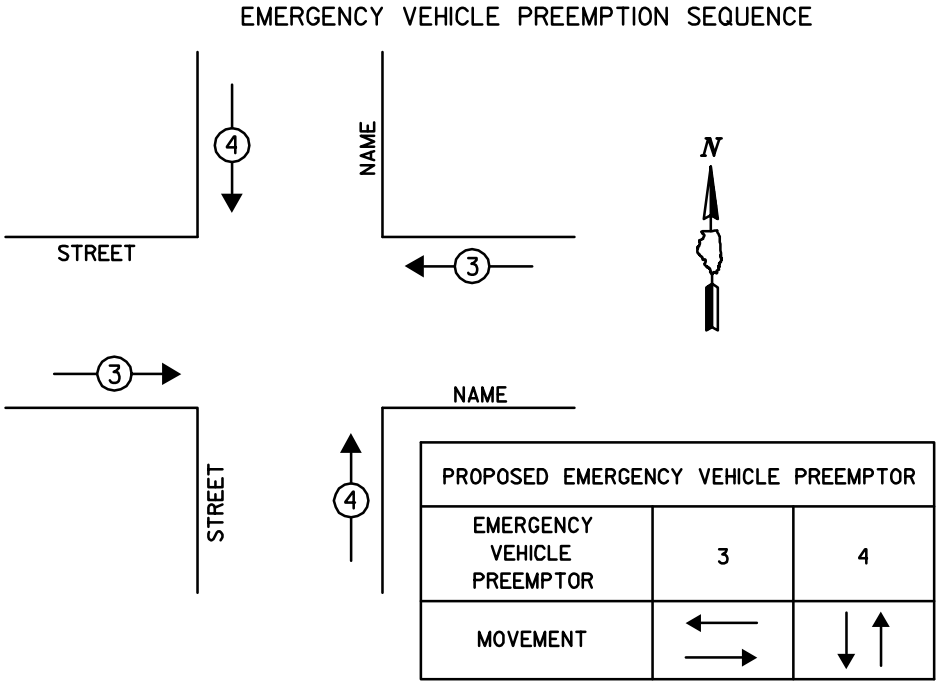
SEE SIGNAL PLAN #1 FOR GENERAL GUIDELINES.

PHASE DIAGRAMS #4

FOUR-LEGGED INTERSECTION W/O PEDESTRIAN CROSSINGS



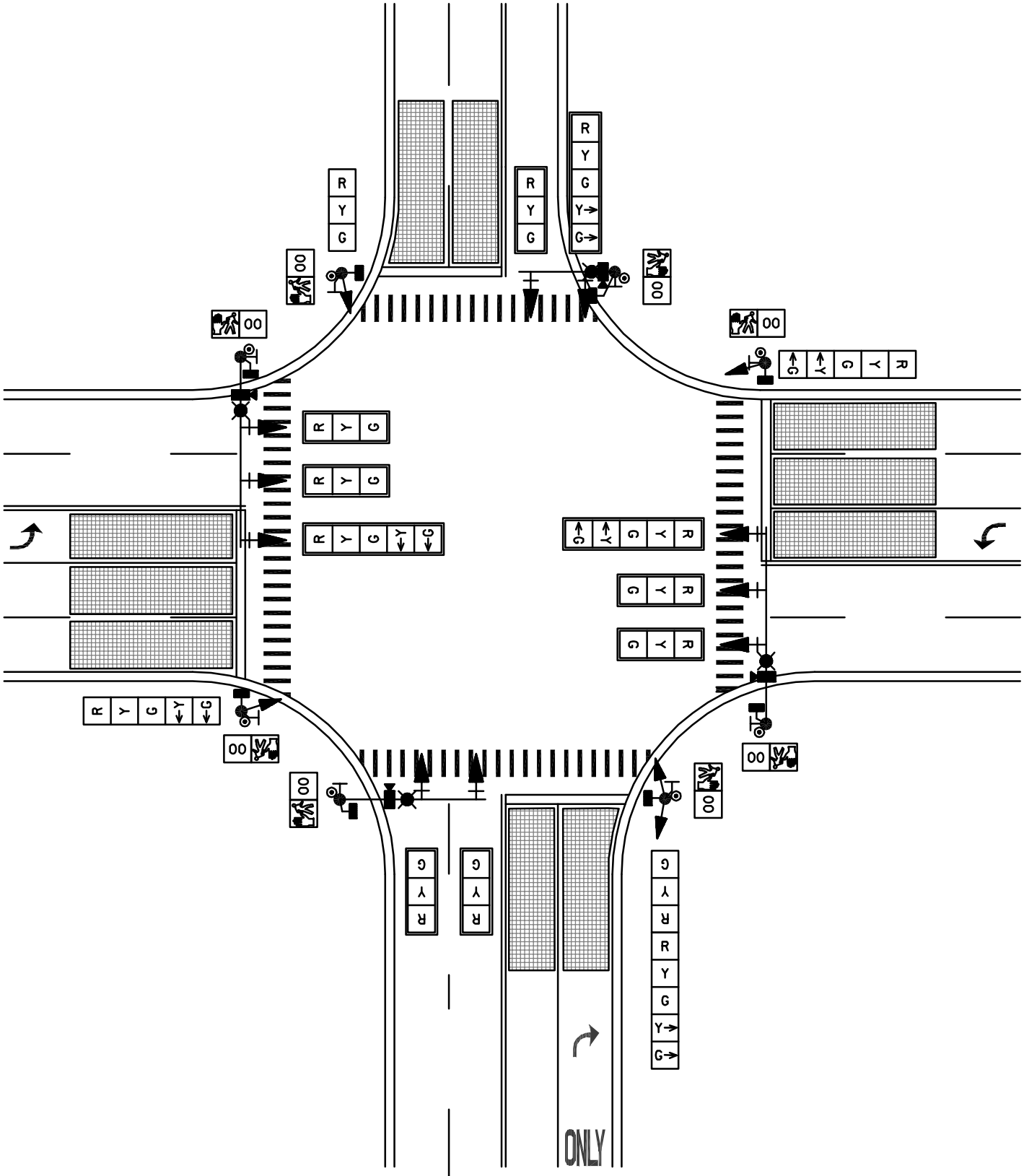
PHASE DESIGNATION DIAGRAM



PROPOSED EMERGENCY VEHICLE PREEMPTOR		
EMERGENCY VEHICLE PREEMPTOR	3	4
MOVEMENT	← →	↓ ↑

SIGNAL PLAN #5

FOUR-LEGGED INTERSECTION WITH PEDESTRIAN CROSSINGS

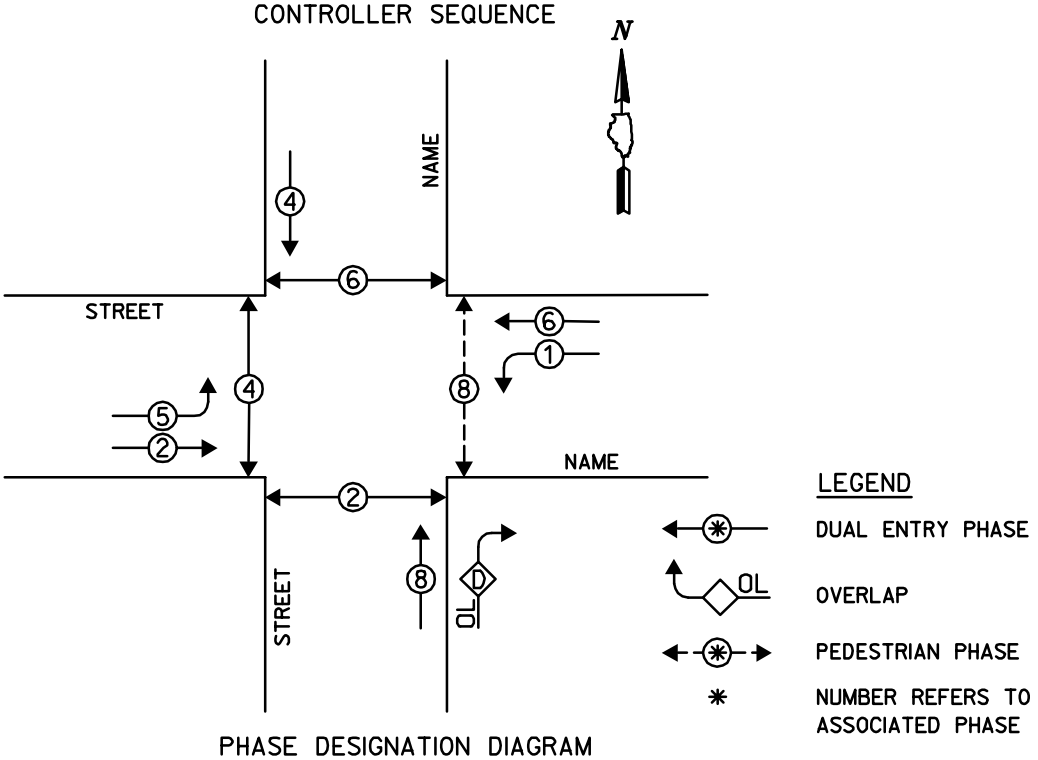


SEE SIGNAL PLAN #1 FOR GENERAL GUIDELINES.

PHASE DIAGRAMS #5

FOUR-LEGGED INTERSECTION WITH PEDESTRIAN CROSSINGS

CONTROLLER SEQUENCE

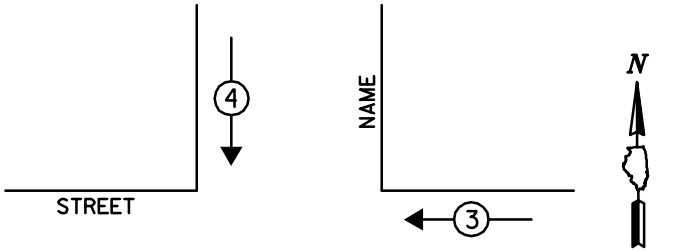


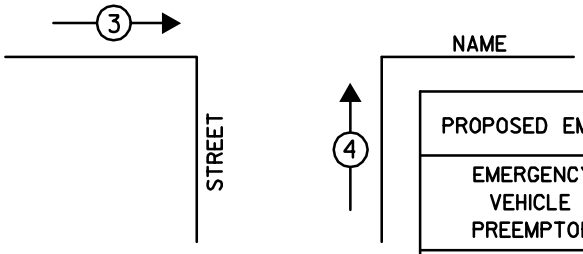
PHASE DESIGNATION DIAGRAM

RIGHT TURN OVERLAP PHASE DESIGNATION

OVERLAP LETTER		PERMISSIVE PHASE		PROTECTED PHASE
D	=	8	+	1

EMERGENCY VEHICLE PREEMPTION SEQUENCE





PROPOSED EMERGENCY VEHICLE PREEMPTOR		
EMERGENCY VEHICLE PREEMPTOR	3	4
MOVEMENT	← →	↓ ↑

APPENDIX C

SAMPLE ESTIMATE OF COST, SIGNAL PLANS AND DETAIL SHEETS

Consultants Name
Address
City, State Zip

ENGINEER'S OPINION OF PROBABLE COST

RANDALL ROAD & HARNISH DRIVE
TRAFFIC SIGNAL MODIFICATIONS
VILLAGE OF ALGONQUIN, ILLINOIS
MCHENRY COUNTY ILLINOIS
PLANS DATED MAY 22, 2008

ITEM #	CODE #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
1.	70102630.	TRAFFIC CONTROL AND PROTECTION, STANDARD 701601-04	1	LS	$6,000.00	$6,000.00
2.	70102625.	TRAFFIC CONTROL AND PROTECTION, STANDARD 701606-04	1	LS	$6,000.00	$6,000.00
3.	70102635.	TRAFFIC CONTROL AND PROTECTION, STANDARD 701701-04	1	LS	$6,000.00	$6,000.00
4.	72000100.	SIGN PANEL - TYPE 1	31.5	SF	$35.00	$1,102.50
5.	81000600.	CONDUIT IN TRENCH, 2" DIA., GALVANIZED STEEL	420	FT	$13.00	$5,460.00
6.	81000700.	CONDUIT IN TRENCH, 2-1/2" DIA., GALVANIZED STEEL	120	FT	$20.00	$2,400.00
7.	81000800.	CONDUIT IN TRENCH, 3" DIA., GALVANIZED STEEL	83	FT	$35.00	$2,905.00
8.	81001000.	CONDUIT IN TRENCH, 4" DIA., GALVANIZED STEEL	10	FT	$29.50	$295.00
9.	81018900.	CONDUIT PUSHED, 4" DIA., GALVANIZED STEEL	640	FT	$38.00	$24,320.00
10.	81400100.	HANDHOLE	2	EA	$1,100.00	$2,200.00
11.	81400300.	DOUBLE HANDHOLE	2	EA	$2,000.00	$4,000.00
12.	X8730027	ELECTRIC CABLE IN CONDUIT, GROUNDING, NO. 6 1C	843	FT	$1.80	$1,517.40
13.	87301225.	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 14 3C	1,172	FT	$1.40	$1,640.80
14.	87301245.	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 14 5C	5,115	FT	$1.70	$8,695.50
15.	87301255.	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 14 7C	2,056	FT	$1.90	$3,906.40
16.	87301805.	ELECTRIC CABLE IN CONDUIT, SERVICE, NO. 6 2C	98	FT	$4.00	$392.00
17.	87302405.	ELECTRIC CABLE IN CONDUIT, COMMUNICATION, NO. 18 (16 x #30), 3C	1,127	FT	$6.00	$6,762.00
18.	X8730250	ELECTRIC CABLE IN CONDUIT, NO. 20 3/C, TWISTED, SHIELDED	1,172	FT	$1.00	$1,172.00
19.	X0322925	ELECTRIC CABLE IN CONDUIT, TRACER NO. 14 1C	2,952	FT	$0.80	$2,361.60
20.	X8710020	FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, MM12F, SM12F	2,952	FT	$2.25	$6,642.00
21.	87502500.	TRAFFIC SIGNAL POST, GALVANIZED STEEL, 16 FT	2	EA	$1,000.00	$2,000.00
22.	87702860.	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE, 24 FT.	2	EA	$5,600.00	$11,200.00
23.	87702980.	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE, 50 FT.	1	EA	$7,000.00	$7,000.00
24.	87703000.	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE, 55 FT.	1	EA	$8,800.00	$8,800.00
25.		STEEL COMBINATION MAST ARM ASSEMBLY AND POLE, 60 FT.	2	EA	$12,000.00	$24,000.00
26.	87800100.	CONCRETE FOUNDATION, TYPE A	8	FT	$185.00	$1,480.00
27.	87800150.	CONCRETE FOUNDATION, TYPE C	4	FT	$525.00	$2,100.00
28.	87800215.	CONCRETE FOUNDATION, TYPE D	4	FT	$550.00	$2,200.00
29.	87800400.	CONCRETE FOUNDATION, TYPE E 30-INCH DIAMETER	30	FT	$185.00	$5,550.00
30.	87800415.	CONCRETE FOUNDATION, TYPE E 36-INCH DIAMETER	30	FT	$205.00	$6,150.00
31.		CONCRETE FOUNDATION, TYPE E 42-INCH DIAMETER (SPECIAL)	42	FT	$230.00	$9,660.00
32.	87900200.	DRILL EXISTING HANDHOLE	1	EA	$250.00	$250.00
33.	88030020.	SIGNAL HEAD, L.E.D., 1-FACE, 3-SECTION, MAST ARM MOUNTED	15	EA	$1,100.00	$16,500.00
34.	88030100.	SIGNAL HEAD, L.E.D., 1-FACE, 5-SECTION, BRACKET MOUNTED	2	EA	$1,550.00	$3,100.00
35.	88030110.	SIGNAL HEAD, L.E.D., 1-FACE, 5-SECTION, MAST ARM MOUNTED	4	EA	$1,650.00	$6,600.00
36.	88030240.	SIGNAL HEAD, L.E.D., 2-FACE, 1-3 SECTION, 1-5 SECTION, BRACKET MOUNTEI	2	EA	$2,500.00	$5,000.00
37.	88200100.	TRAFFIC SIGNAL BACKPLATE	20	EA	$180.00	$3,600.00
38.	88700200.	LIGHT DETECTOR	4	EA	$1,250.00	$5,000.00
39.	88700300.	LIGHT DETECTOR AMPLIFIER	1	EA	$3,300.00	$3,300.00
40.	85700205.	FULL ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL	1	EA	$17,000.00	$17,000.00
41.	86400100.	TRANSCEIVER - FIBER OPTIC	1	EA	$3,800.00	$3,800.00
42.	X8620020	UNINTERRUPTIBLE POWER SUPPLY (UPS)	1	EA	$10,000.00	$10,000.00
43.	X8050010	SERVICE INSTALLATION, GROUND MOUNT	1	EA	$2,000.00	$2,000.00
44.	81900200.	TRENCH AND BACKFILL FOR ELECTRICAL WORK	620	FT	$3.30	$2,046.00
45.	XX005230	VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION)	1	EA	$50,000.00	$50,000.00
46.	X0325705	RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM - LEVEL II	1	EA	$2,600.00	$2,600.00
47.	85000200.	MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION	1	EA	$1,000.00	$1,000.00

Consultants Name
Address
City, State Zip

ENGINEER'S OPINION OF PROBABLE COST

RANDALL ROAD & HARNISH DRIVE
TRAFFIC SIGNAL MODIFICATIONS
VILLAGE OF ALGONQUIN, ILLINOIS
MCHENRY COUNTY ILLINOIS
PLANS DATED MAY 22, 2008

ITEM #	CODE #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
48.	89502300.	REMOVE ELECTRICAL CABLE FROM CONDUIT	4,418	FT	$0.42	$1,855.56
49.	89502375.	REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT	1	EA	$1,500.00	$1,500.00
50.	89502380.	REMOVE EXISTING HANDHOLE	5	EA	$250.00	$1,250.00
51.	89502385.	REMOVE EXISTING CONCRETE FOUNDATION	9	EA	$240.00	$2,160.00
52.	89000100.	TEMPORARY TRAFFIC SIGNAL INSTALLATION	1	EA	$50,000.00	$50,000.00
53.	X0325737	TEMPORARY TRAFFIC SIGNAL TIMINGS	1	EA	$5,000.00	$5,000.00

SUBTOTAL:	$367,473.76
10% CONTINGENCY:	$36,747.38
TOTAL:	**$404,221.14**

CONTRACT NO. 83844

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	04-00101-00-TL	MCHENRY	22	1

PROJECT SPONSOR

CITY OF CRYSTAL LAKE
PUBLIC WORKS DEPARTMENT
100 W. MUNICIPAL COMPLEX
P.O. BOX 597
CRYSTAL LAKE, IL 60039-0597
TELEPHONE: 815.459.2020
FAX: 815.459.2350

MCHENRY COUNTY
DIVISION OF TRANSPORTATION
16111 NELSON ROAD
WOODSTOCK, IL 60098-9533
TELEPHONE: 815.334.4960
FAX: 815.334.4989

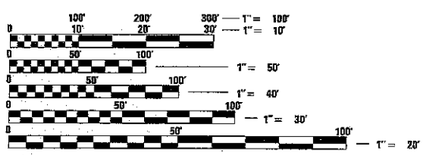
FEBRUARY 17, 2006

INDEX OF SHEETS

HIGHWAY STANDARDS (EFFECTIVE 8-5-05)

424001	CURB RAMPS FOR SIDEWALKS
701006	OFF-RD OPERATIONS, 2L, 2W, 15' TO 24" FROM PAVEMENT EDGE
701201	LANE CLOSURE, 2L, 2W, DAY ONLY, FOR SPEEDS >= 45 MPH
701301	LANE CLOSURE, 2L , 2W, SHORT TIME OPERATIONS
701701	URBAN LANE CLOSURE, MULTILANE INTERSECTION
701801	LANE CLOSURE, MULTILANE, 1W OR 2W CROSSWALK OR SIDEWALK CLOSURE
702001	TRAFFIC CONTROL DEVICES
720001	SIGN PANEL MOUNTING DETAILS
720006	SIGN PANEL ERECTION DETAILS
805001	ELECTRICAL SERVICE INSTALLATION DETAILS
814001	CONCRETE HANDHOLES
814006	DOUBLE HANDHOLES
857001	STANDARD PHASE DESIGNATION DIAGRAMS AND PHASE SEQUENCES
877011	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE
878001	CONCRETE FOUNDATION DETAILS
880006	TRAFFIC SIGNAL MOUNTING DETAILS

FEDERAL AID COORDINATOR: PHIL MARCYN 847.705.4189



FULL SIZE PLANS HAVE BEEN PREPARED USING STANDARD ENGINEERING SCALES. REDUCED SIZED PLANS WILL NOT CONFORM TO STANDARD SCALES. IN MAKING MEASUREMENTS ON REDUCED PLANS, THE ABOVE SCALES MAY BE USED.

J.U.L.I.E.
JOINT UTILITY LOCATION INFORMATION FOR EXCAVATION
1-800-892-0123

CONTRACT NO. 83844

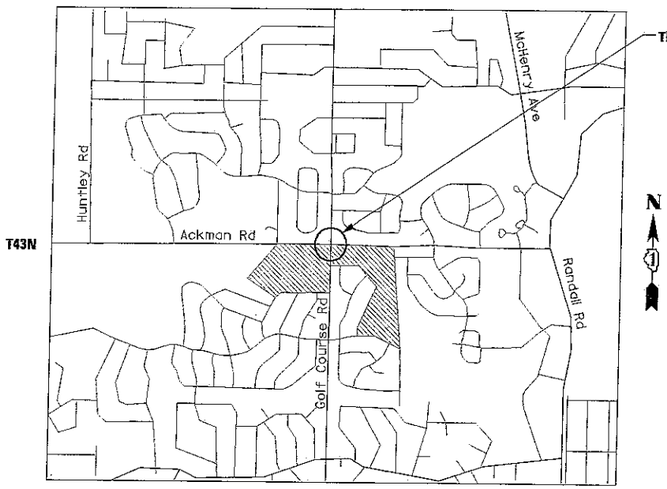
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROPOSED
TRAFFIC SIGNAL PLANS

ACKMAN ROAD FAU 3873 (CH 42-A46) AT GOLF COURSE ROAD FAU 3872

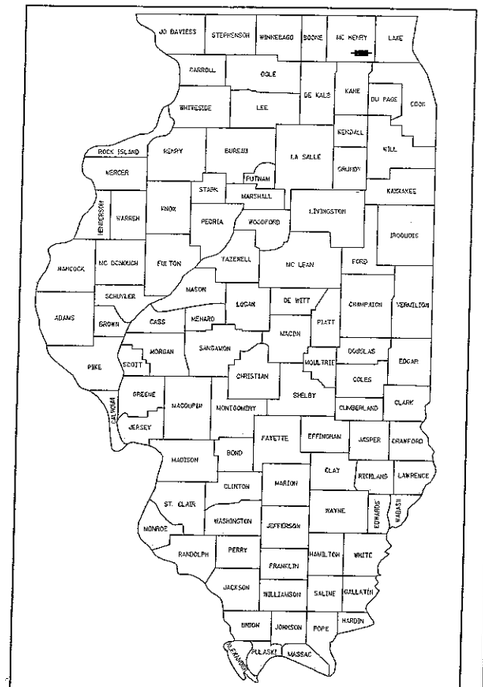
SECTION 04-00101-00-TL
PROJECT NO: M-8003 (548)
JOB NO: C-91-083-06
TRAFFIC SIGNAL IMPROVEMENTS
CITY OF CRYSTAL LAKE
MCHENRY COUNTY

ALGONQUIN TOWNSHIP

LOCATION MAP



TRAFFIC SIGNAL IMPROVEMENT



LOCATION OF SECTION INDICATED THUS: —■—

CITY OF CRYSTAL LAKE

APPROVED Feb. 22 20 06

CITY ENGINEER

COUNTY OF MCHENRY
DIVISION OF TRANSPORTATION

APPROVED FEB. 27 20 06

DIRECTOR OF TRANSPORTATION / COUNTY ENGINEER

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PASSED _____ 20 _____

ENGINEER OF LOCAL ROADS AND STREETS

APPROVED _____ 20 _____

DEPUTY DIRECTOR OF HIGHWAYS, REGION ENGINEER

PRINTED BY THE AUTHORITY OF THE STATE OF ILLINOIS

ILLINOIS DEPARTMENT OF PROFESSIONAL REGULATION REGISTRATION NO. 184-000812

I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED UNDER MY DIRECT SUPERVISION.

DATED AT ST. CHARLES, ILLINOIS THIS 21st DAY OF February, 2006

Matthew A Gauntt

MATTHEW GAUNTT
ILLINOIS REG. PROF. ENGINEER NO. 062-050146 EXPIRATION DATE 11-30-2007

MATTHEW A. GAUNTT — 062-050146 — REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS

RHA&A
Robert H. Anderson & Associates, Inc.
Consulting Engineers & Land Surveyors
Timbers Professional Center
220 West River Drive, St Charles, Illinois 60174
Phone - 630.584.3530 Fax - 630.584.3047
Email - rhaarhaengr.com

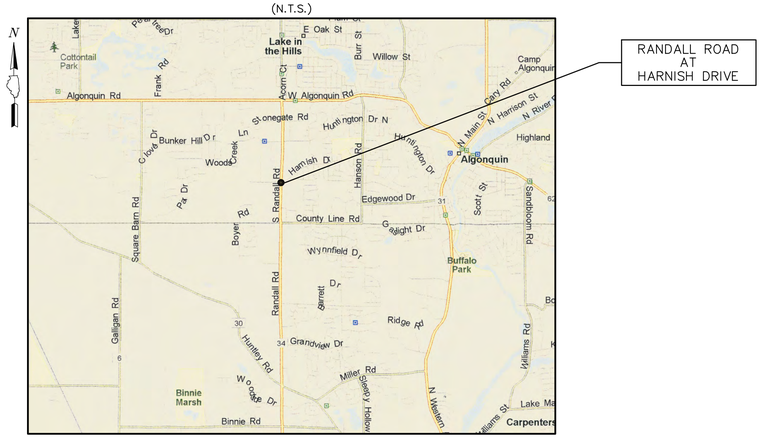
STATE OF ILLINOIS
VILLAGE OF ALGONQUIN
PLANS FOR
TRAFFIC SIGNAL MODERNIZATION PLANS
RANDALL ROAD AT HARNISH DRIVE
McHENRY COUNTY DIVISION OF TRANSPORTATION

3254.905 RANDALL ROAD AT HARNISH DRIVE

SHEET INDEX

LOCATION OF SECTION INDICATED THUS:

LOCATION MAP
(N.T.S.)



HIGHWAY STANDARD LIST

701006-02 OFF-ROAD OPERATIONS, 2L, 2W, 4.5m (15') TO PAVEMENT EDGE FOR SPEEDS >45 MPH
701011-01 OFF-ROAD MOVING OPERATIONS, 2L, 2W, DAY ONLY FOR SPEEDS >45 MPH
701101-01 OFF-ROAD OPERATIONS, MULTILANE, LESS THAN 4.5m (15') AWAY, FOR SPEEDS >45 MPH.
701301-02 LANE CLOSURE, 2L, 2W, SHORT TIME OPERATIONS FOR SPEEDS >45 MPH
701901 TRAFFIC CONTROL DEVICES
424001-05 CURB RAMPS FOR SIDEWALKS
780001-01 TYPICAL PAVEMENT MARKINGS
805001 ELECTRICAL SERVICE INSTALLATION DETAILS
814001-01 HANDHOLES
814006-01 DOUBLE HANDHOLES
877011-03 STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 16' THROUGH 55'
877012 STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 56' THROUGH 75'
878001-06 CONCRETE FOUNDATION DETAILS
880001 SPAN WIRE MOUNTED SIGNALS AND FLASHING BEACON INSTALLATION
880006 TRAFFIC SIGNAL MOUNTING DETAILS
886001 DETECTOR LOOP INSTALLATIONS
857001 STANDARD PHASE DESIGNATION DIAGRAMS AND PHASE SEQUENCES
862001 UNINTERRUPTABLE POWER SUPPLY (UPS)
873001-01 TRAFFIC SIGNAL GROUNDING AND BONDING
701601-05 URBAN LANE CLOSURE, MULTILANE, 1W OR 2W WITH NON-TRANSVERSABLE MEDIAN
701701-05 URBAN LANE CLOSURE, MULTILANE INTERSECTION
701801-03 LANE CLOSURE MULTILANE 1W OR 2W CROSSWALK OR SIDEWALK CLOSURE

PLANS PREPARED BY:

GEWALT HAMILTON ASSOCIATES, INC.
Consulting Engineers & Surveyors
850 Forest Edge Drive
Vernon Hills, IL 60061
847-478-9700
FAX 847-478-9701

EXISTING CONDITIONS

THESE PLANS HAVE BEEN PREPARED USING ALL EXISTING CONDITIONS, UTILITIES, SETBACKS, TOPOGRAPHIC INFORMATION, STATIONING, RIGHT OF WAY, ELEVATIONS, BENCH MARKS AND EASEMENTS FROM PLANS PREPARED BY CRAIG R. KNOCHE & ASSOCIATES, DATED 8-2-07.

EXISTING UTILITIES: WHEN THE PLANS OR SPECIAL PROVISIONS INCLUDE INFORMATION PERTAINING TO THE LOCATION OF UNDERGROUND UTILITY FACILITIES, SUCH INFORMATION REPRESENTS ONLY THE OPINION OF THE ENGINEER AS TO THE LOCATION OF SUCH UTILITIES AND IS ONLY INCLUDED FOR THE CONVENIENCE OF THE BIDDER. THE ENGINEER AND OWNER ASSUME NO RESPONSIBILITY WHATEVER IN RESPECT TO THE SUFFICIENCY OR ACCURACY OF THE INFORMATION SHOWN ON THE PLANS RELATIVE TO THE LOCATION OF UNDERGROUND UTILITY FACILITIES OR THE MANNER IN WHICH THEY ARE TO BE REMOVED OR ADJUSTED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ACTUAL LOCATION OF ALL SUCH FACILITIES. HE SHALL ALSO OBTAIN FROM THE RESPECTIVE UTILITY COMPANIES, DETAILED INFORMATION RELATIVE TO THE LOCATION OF THEIR FACILITIES AND THE WORKING SCHEDULES OF THE UTILITY COMPANIES FOR REMOVING OR ADJUSTING THEM.

CONTRACTOR IS RESPONSIBLE FOR CONTACTING J.U.L.I.E. AT 1-800-892-0123 AND MUST ACQUIRE A DIG NUMBER A MINIMUM OF 72 HOURS PRIOR TO ANY WORK BEING DONE.

SAFETY IS THE SOLE AND EXCLUSIVE RESPONSIBILITY OF THE CONTRACTOR

J.U.L.I.E. TOLL FREE 1-800-892-0123
JOINT UTILITY LOCATING INFORMATION FOR EXCAVATORS
Call 48 hours before you dig (Excluding Sat., Sun., & Holidays)
1-800-892-0123

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

UTILITY CONTACT INFORMATION:

COMCAST
MR. ANDY KOLOSOWSKI
4513 WESTERN AVENUE
LISLE, IL 60532
630-810-6261

ComEd
MS. AUDREY HELGESEN
1500 FRANKLIN BOULEVARD
LIBERTYVILLE, IL 60048
847-816-5225

MCI
MR. THOMAS BUHER
P.O. BOX 387
SUMMIT, IL 60501
708-458-6410

PEOPLES ENERGY/NORTH SHORE GAS
MR. GERRY GLOGOVSKY
3001 GRAND AVENUE
WAUKEGAN, IL 60085
847-263-4687

SBC
MR. JASON MOOK
1200 N. ARLINGTON HEIGHTS ROAD
ARLINGTON HEIGHTS, IL 60004
847-506-8721

DANIEL P. BRINKMAN 062-055293 LICENSED PROFESSIONAL ENGINEER OF ILLINOIS

ISSUED FOR CONSTRUCTION
5-22-08

GEWALT HAMILTON ASSOCIATES, INC.
CONSULTING ENGINEERS & SURVEYORS
850 Forest Edge Drive Vernon Hills, IL 60061 Tel. 847.478.9700 Fax 847.478.9701

TITLE SHEET

TRAFFIC SIGNAL MODERNIZATION PLANS
RANDALL ROAD AT HARNISH DRIVE
VILLAGE OF ALGONQUIN, ILLINOIS

NO.	BY	DATE	REVISION
3	PJS	5-8-08	PER MCDOT REVIEW AND CONNENTS (5-1-08)
2	LJD	4/25/08	PER VILLAGE REVIEW AND COMMENTS (4/7/08)
1	LJD	3/12/08	PER MCDOT REVIEW AND COMMENTS (2/22/08)

NO.	BY	DATE	REVISION

FILE: 3254-905-TR2.dwg
DRAWN BY: LJD
DATE: 12-31-07
GHA PROJECT # 3254.905
CHECKED BY: DPB
DATE: 1-25-08
SCALE: N/A
SHEET NUMBER: 1
OF 17 SHEETS

SUMMARY OF QUANTITIES

NO.	CODE NO.	ITEM	UNIT	TOTAL	RANDALL ROAD AT HARNISH DRIVE	INTERCONNECT
1.	70102630	TRAFFIC CONTROL AND PROTECTION, STANDARD 701601-04	L.SUM	1		1
2.	70102625	TRAFFIC CONTROL AND PROTECTION, STANDARD 701606-04	L.SUM	1		1
3.	70102635	TRAFFIC CONTROL AND PROTECTION, STANDARD 701701-04	L.SUM	1		1
4.	72000100	SIGN PANEL - TYPE 1	SQ.FT.	31.5	31.5	
5.	81000600	CONDUIT IN TRENCH, 2" DIA., GALVANIZED STEEL	FOOT	420	80	340
6.	81000700	CONDUIT IN TRENCH, 2-1/2" DIA., GALVANIZED STEEL	FOOT	120	120	
7.	81000800	CONDUIT IN TRENCH, 3" DIA., GALVANIZED STEEL	FOOT	83	83	
8.	81001000	CONDUIT IN TRENCH, 4" DIA., GALVANIZED STEEL	FOOT	10	10	
9.	81018900	CONDUIT PUSHED, 4" DIA., GALVANIZED STEEL	FOOT	640	640	
10.	81400100	HANDHOLE	EACH	2	2	
11.	81400300	DOUBLE HANDHOLE	EACH	2	2	
12.	X8730027	ELECTRIC CABLE IN CONDUIT, GROUNDING, NO. 6 1C	FOOT	843	843	
13.	87301225	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 3C	FOOT	1,172	1,172	
14.	87301245	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 5C	FOOT	5,115	5,115	
15.	87301255	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 7C	FOOT	2,056	2,056	
16.	87301805	ELECTRIC CABLE IN CONDUIT, SERVICE, NO.6 2C	FOOT	98	98	
17.	87301615	ELECTRIC CABLE IN CONDUIT, COMMUNICATION, NO. 18 (16 x #30), 3C	FOOT	1,127	1,127	
18.	X8730250	ELECTRIC CABLE IN CONDUIT, NO. 20 3/C, TWISTED, SHIELDED	FOOT	1,172	1,172	
19.	X0322925	ELECTRIC CABLE IN CONDUIT, TRACER NO. 14 1C	FOOT	2,952		2,952
20.	X8710020	FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, MM12F, SM12F	FOOT	2,952		2,952
21.	87502500	TRAFFIC SIGNAL POST, GALVANIZED STEEL, 16 FT	EACH	2	2	
22.	87702850	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE, 24 FT.	EACH	2	2	
23.	87702980	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE, 50 FT.	EACH	1	1	
24.	87700320	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE, 55 FT.	EACH	1	1	
25.	-	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE, 60 FT.	EACH	2	2	
26.	87800100	CONCRETE FOUNDATION, TYPE A	FOOT	8	8	
27.	87800150	CONCRETE FOUNDATION, TYPE C	FOOT	4	4	
28.	87000200	CONCRETE FOUNDATION, TYPE D	FOOT	4	4	
29.	87800400	CONCRETE FOUNDATION, TYPE E 30-INCH DIAMETER	FOOT	30	30.0	
30.	87800415	CONCRETE FOUNDATION, TYPE E 36-INCH DIAMETER	FOOT	30	30	
31.	X0325740	CONCRETE FOUNDATION, TYPE E 42-INCH DIAMETER (SPECIAL)	FOOT	42	42	
32.	87900200	DRILL EXISTING HANDHOLE	EACH	1		1
33.	X8800020	SIGNAL HEAD, L.E.D., 1-FACE, 3-SECTION, MAST ARM MOUNTED	EACH	15	15	
34.	X8800040	SIGNAL HEAD, L.E.D., 1-FACE, 5-SECTION, BRACKET MOUNTED	EACH	2	2	
35.	X8800070	SIGNAL HEAD, L.E.D., 1-FACE, 5-SECTION, MAST ARM MOUNTED	EACH	4	4	
36.	X8810620	SIGNAL HEAD, L.E.D., 2-FACE, 1-3 SECTION, 1-5 SECTION, BRACKET MOUNTED	EACH	2	2	
37.	88200210	TRAFFIC SIGNAL BACKPLATE	EACH	20	20	
38.	88700200	LIGHT DETECTOR	EACH	4	4	
39.	88700300	LIGHT DETECTOR AMPLIFIER	EACH	1	1	
40.	85700205	FULL ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL	EACH	1	1	
41.	86400100	TRANSCEIVER - FIBER OPTIC	EACH	1	1	
42.	X0300739	UNINTERRUTIBLE POWER SUPPLY (UPS)	EACH	1	1	
43.	X8050010	SERVICE INSTALLATION, GROUND MOUNT	EACH	1	1	
44.	81500200	TRENCH AND BACKFILL FOR ELECTRICAL WORK	FOOT	620	280	340
45.	XX003552	VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION)	EACH	1	1	
46.	X0325705	RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM - LEVEL II	EACH	1		1
47.	85000200	MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION	EACH	1		1
48.	89502300	REMOVE ELECTRICAL CABLE FROM CONDUIT	FOOT	4,418		4,418
49.	89502375	REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT	EACH	1	1	
50.	89502380	REMOVE EXISTING HANDHOLE	EACH	5	5	
51.	89502385	REMOVE EXISTING CONCRETE FOUNDATION	EACH	9	9	
52.	89000100	TEMPORARY TRAFFIC SIGNAL INSTALLATION	EACH	1	1	
53.	X0325737	TEMPORARY TRAFFIC SIGNAL TIMINGS	EACH	1	1	

GEWALT HAMILTON ASSOCIATES, INC.
CONSULTING ENGINEERS & SURVEYORS
850 Forest Edge Drive Vernon Hills, IL 60061 Tel. 847.478.9700 Fax 847.478.9701

SUMMARY OF QUANTITIES

TRAFFIC SIGNAL MODERNIZATION PLANS
RANDALL ROAD AT HARNISH DRIVE
VILLAGE OF ALGONQUIN, ILLINOIS

NO.	BY	DATE	REVISION
3	PJS	5-8-08	PER MCDOT REVIEW AND CONNENTS (5-1-08)
2	LJD	4/25/08	PER VILLAGE REVIEW AND COMMENTS (4/7/08)
1	LJD	3/12/08	PER MCDOT REVIEW AND COMMENTS (2/22/08)

NO.	BY	DATE	REVISION

FILE: 3254-905-TR2.dwg
DRAWN BY: LJD
DATE: 12-31-07
GHA PROJECT # 3254.905
CHECKED BY: DPB
DATE: 1-25-08
SCALE: N/A

SHEET NUMBER: 2
OF 17 SHEETS

TRAFFIC SIGNAL LEGEND

	PROPOSED	EXISTING
CONTROLLER	▬	▭
SERVICE INSTALLATION	■	⊟
SIGNAL HEAD AND POST	►	▷
SIGNAL HEAD AND BACKPLATE	►▮	▷▯
SIGNAL HEAD, PEDESTRIAN	▮	▯
SIGNAL POST	●	○
MAST ARM ASSEMBLY AND POLE, STEEL	●—	○—
MAST ARM ASSEMBLY AND POLE, ALUMINUM	●▷	○▷
COMBINATION MAST ARM ASSEMBLY AND POLE, STEEL WITH LUMINAIRE	●—✳	○—✳
UNIT DUCT	UD	
COMMON TRENCH	CT	
HANDHOLE	◥	◥
HEAVY DUTY HANDHOLE	H	H
DOUBLE HANDHOLE	◥◤	◥◤
G.S. CONDUIT IN TRENCH (T) OR PUSHED (P)	-----	═══
STREET LIGHT LUMINAIRE (400 W H.P.S. MC-3)	✳	✳
VIDEO DETECTION CAMERA		
DETECTION ZONE	▨	
DOME PAN/TILT/ZOOM (PTZ) CAMERA	▭	
ALUMINUM LIGHT POLE WITH LUMINAIRE (250 W H.P.S. MC-3) 45' MOUNTING HEIGHT WITH 20' ARM	●—✳	
PEDESTRIAN PUSHBUTTON DETECTOR	⊙	◎
DETECTOR LOOP	□	⬚
CAST IRON JUNCTION BOX	Ⓘ	Ⓘ"E"
EMERGENCY VEHICLE SYSTEM DETECTOR	◄	◄

	PROPOSED	EXISTING
CONFIRMATION BEACON	⊸	⊸
SIGNAL HEAD OPTICALLY PROGRAMMED	►"P"	▷"P"
CONDUIT SPLICE	⊸⊸	
WOOD POLE	⊗	⊗"E"
RACEWAY FOR MAGNETIC DETECTOR, TYPE I OR TYPE II	═══	═══"E"
VEHICLE DETECTOR, NON COMPENSATED MAGNETIC TYPE	▬	▭
RAILROAD CONTROL CABINET	⊠	⊠"E"
TELEPHONE CONNECTION	T	T"E"
ILLUMINATED SIGN "NO LEFT TURN"	⊘	⊘"E"
ILLUMINATED SIGN "NO RIGHT TURN"	⊘	⊘"E"
UNINTERRUPTIBLE POWER SUPPLY (UPS)	B	B"E"

GRAPHIC SCALE
20 0 10 20
(IN FEET)
1 inch = 20 ft.

SIGN DETAIL

(A) LEFT ON GREEN ARROW ONLY

R 10-5
30" x 36" (TYPICAL)
SIGN PANEL TYPE 1
8 REQUIRED

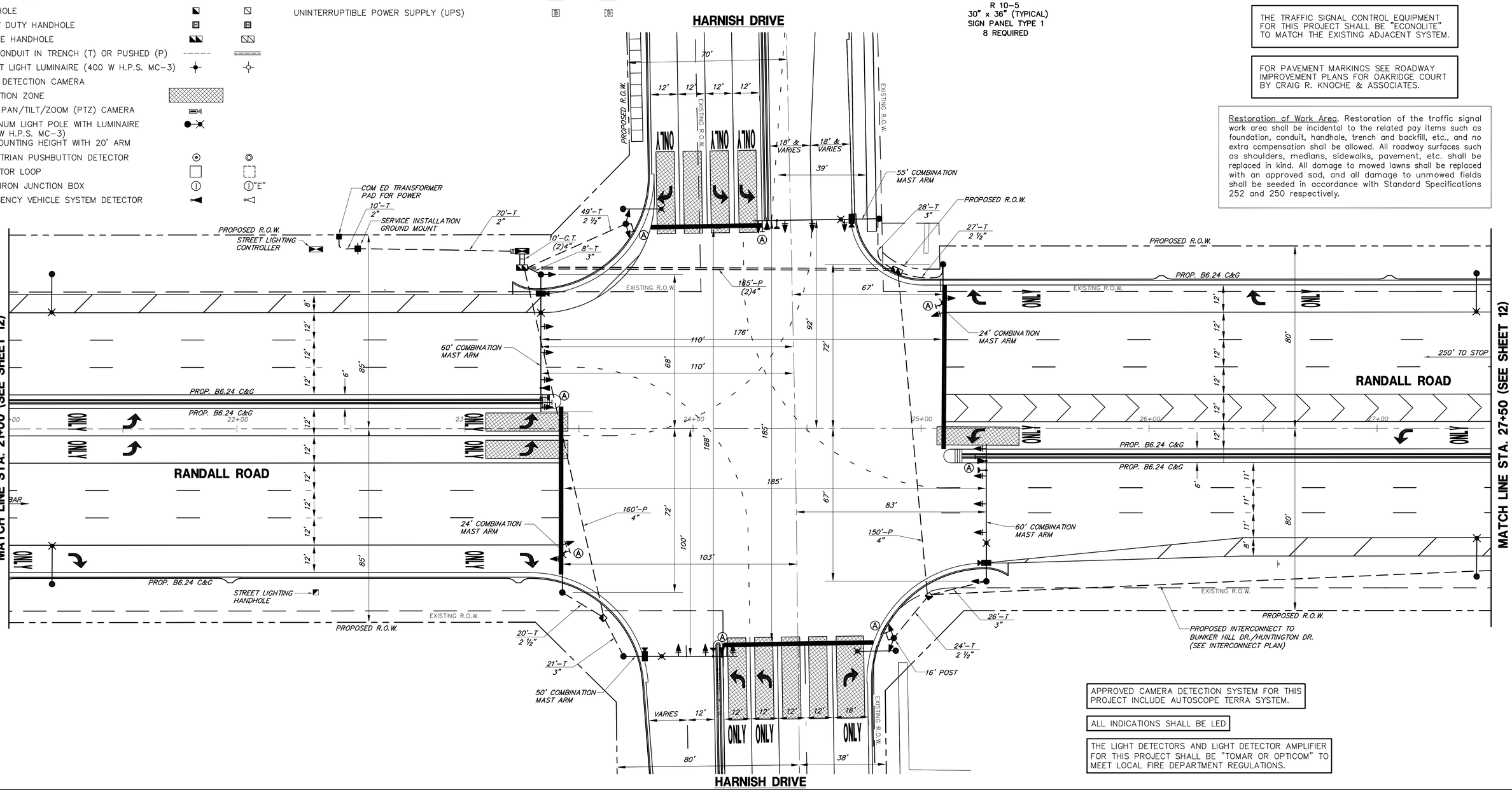
CONSTRUCTION NOTES

1. APPROVED CAMERA DETECTION SYSTEM FOR THIS PROJECT INCLUDE THE AUTOSCOPE TERRA SYSTEM.
2. ALL COMBINATION MAST ARM ASSEMBLY AND POLES SHALL HAVE A 20' ARM TO MOUNT THE VIDEO DETECTION CAMERA AND LUMINAIRE. THE ARM SHALL BE ALIGNED DIRECTLY ABOVE AND PARALLEL TO THE MAST ARM.
3. MAST ARMS AND POSTS SHALL BE GALVANIZED FINISH.
4. PROVIDE 2-2" CONDUIT STUBS IN EACH FOUNDATION FOR MAST ARM ASSEMBLY AND POLE WITH LUMINAIRE.

THE TRAFFIC SIGNAL CONTROL EQUIPMENT FOR THIS PROJECT SHALL BE "ECONOLITE" TO MATCH THE EXISTING ADJACENT SYSTEM.

FOR PAVEMENT MARKINGS SEE ROADWAY IMPROVEMENT PLANS FOR OAKRIDGE COURT BY CRAIG R. KNOCHE & ASSOCIATES.

Restoration of Work Area. Restoration of the traffic signal work area shall be incidental to the related pay items such as foundation, conduit, handhole, trench and backfill, etc., and no extra compensation shall be allowed. All roadway surfaces such as shoulders, medians, sidewalks, pavement, etc. shall be replaced in kind. All damage to mowed lawns shall be replaced with an approved sod, and all damage to unmowed fields shall be seeded in accordance with Standard Specifications 252 and 250 respectively.



APPROVED CAMERA DETECTION SYSTEM FOR THIS PROJECT INCLUDE AUTOSCOPE TERRA SYSTEM.

ALL INDICATIONS SHALL BE LED

THE LIGHT DETECTORS AND LIGHT DETECTOR AMPLIFIER FOR THIS PROJECT SHALL BE "TOMAR OR OPTICOM" TO MEET LOCAL FIRE DEPARTMENT REGULATIONS.

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TRAFFIC SIGNAL MODERNIZATION PLAN

TRAFFIC SIGNAL MODERNIZATION PLANS
RANDALL ROAD AT HARNISH DRIVE
VILLAGE OF ALGONQUIN, ILLINOIS

NO.	BY	DATE	REVISION
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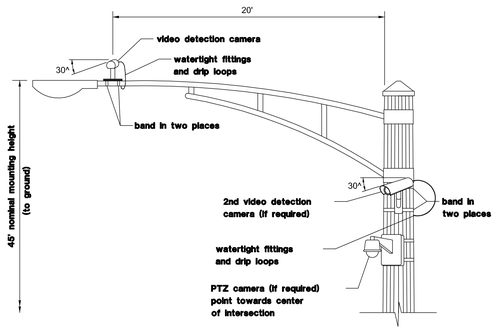
FILE: 3254-905-TR2.dwg
DRAWN BY: LJD DATE: 12-31-07
GHA PROJECT # 3254.905
CHECKED BY: DPB DATE: 1-25-08
SCALE: 1"=20'
SHEET NUMBER: 11 OF 17 SHEETS

TRAFFIC SIGNAL LEGEND

	PROPOSED	EXISTING
CONTROLLER	▬	▭
SERVICE INSTALLATION	■	⊟
SIGNAL HEAD AND POST	→	▷
SIGNAL HEAD AND BACKPLATE	▶	▷
SIGNAL HEAD, PEDESTRIAN	■	▯
SIGNAL POST	●	○
MAST ARM ASSEMBLY AND POLE, STEEL	●—	○—
MAST ARM ASSEMBLY AND POLE, ALUMINUM	●▷	○▷
COMBINATION MAST ARM ASSEMBLY AND POLE, STEEL WITH LUMINAIRE	●✳	○✳
UNIT DUCT	UD	
COMMON TRENCH	CT	
HANDHOLE	◪	◪
HEAVY DUTY HANDHOLE	H	H
DOUBLE HANDHOLE	◪◪	◪◪
G.S. CONDUIT IN TRENCH (T) OR PUSHED (P)	-----	═══
STREET LIGHT LUMINAIRE (400 W H.P.S. MC-3)	✳	✳
VIDEO DETECTION CAMERA		
DETECTION ZONE	▩	
DOME PAN/TILT/ZOOM (PTZ) CAMERA	▭	
ALUMINUM LIGHT POLE WITH LUMINAIRE (250 W H.P.S. MC-3) 45' MOUNTING HEIGHT WITH 20' ARM	●✳	
PEDESTRIAN PUSHBUTTON DETECTOR	⊙	◎
DETECTOR LOOP	□	⬚
CAST IRON JUNCTION BOX	Ⓘ	Ⓘ"E"
EMERGENCY VEHICLE SYSTEM DETECTOR	◀	◁

	PROPOSED	EXISTING
CONFIRMATION BEACON	⊸	⊸
SIGNAL HEAD OPTICALLY PROGRAMMED	→"P"	▷"P"
CONDUIT SPLICE	⊸⊸	
WOOD POLE	⊗	⊗"E"
RACEWAY FOR MAGNETIC DETECTOR, TYPE I OR TYPE II	═══	═══"E"
VEHICLE DETECTOR, NON COMPENSATED MAGNETIC TYPE	▬	▭
RAILROAD CONTROL CABINET	▣	▣"E"
TELEPHONE CONNECTION	T	T"E"
ILLUMINATED SIGN "NO LEFT TURN"	◫	◫"E"
ILLUMINATED SIGN "NO RIGHT TURN"	◫	◫"E"
UNINTERRUPTIBLE POWER SUPPLY (UPS)	B	B"E"

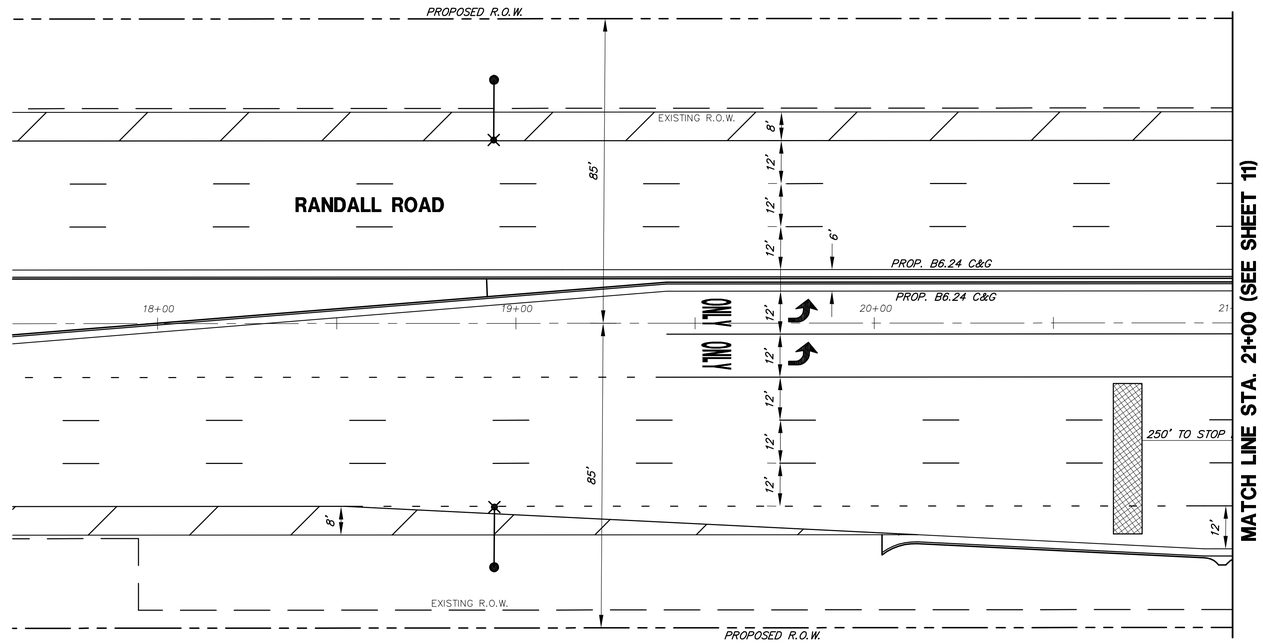


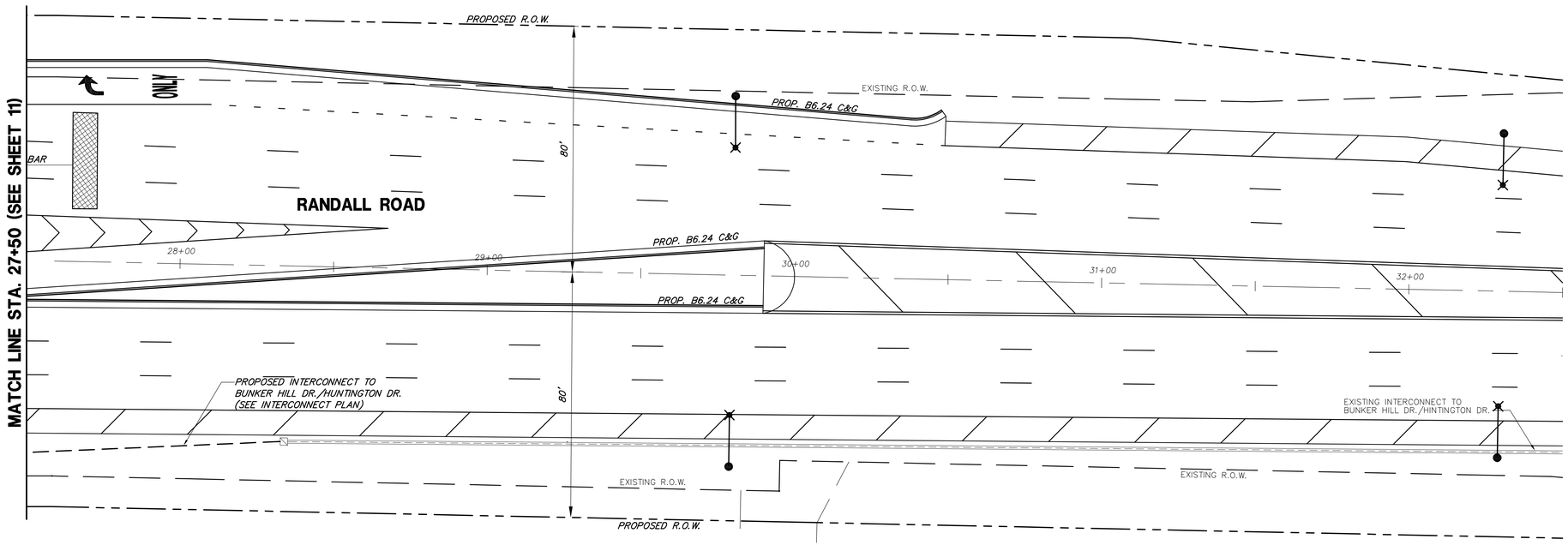
VIDEO DETECTION CAMERA(S) AND PTZ CAMERA MOUNTING DETAIL

GRAPHIC SCALE

20 0 10 20

(IN FEET)
1 inch = 20 ft.





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Restoration of Work Area. Restoration of the traffic signal work area shall be incidental to the related pay items such as foundation, conduit, handhole, trench and backfill, etc., and no extra compensation shall be allowed. All roadway surfaces such as shoulders, medians, sidewalks, pavement, etc. shall be replaced in kind. All damage to mowed lawns shall be replaced with an approved sod, and all damage to unmowed fields shall be seeded in accordance with Standard Specifications 252 and 250 respectively.

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TRAFFIC SIGNAL MODERNIZATION PLAN

TRAFFIC SIGNAL MODERNIZATION PLANS
RANDALL ROAD AT HARNISH DRIVE
VILLAGE OF ALGONQUIN, ILLINOIS

NO.	BY	DATE	REVISION
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1	LJD	3/12/08	PER MCDOT REVIEW AND COMMENTS (2/22/08)

NO.	BY	DATE	REVISION

FILE: 3254-905-TR2.dwg

DRAWN BY: LJD
DATE: 12-31-07

GHA PROJECT # 3254.905

CHECKED BY: DPB
DATE: 1-25-08

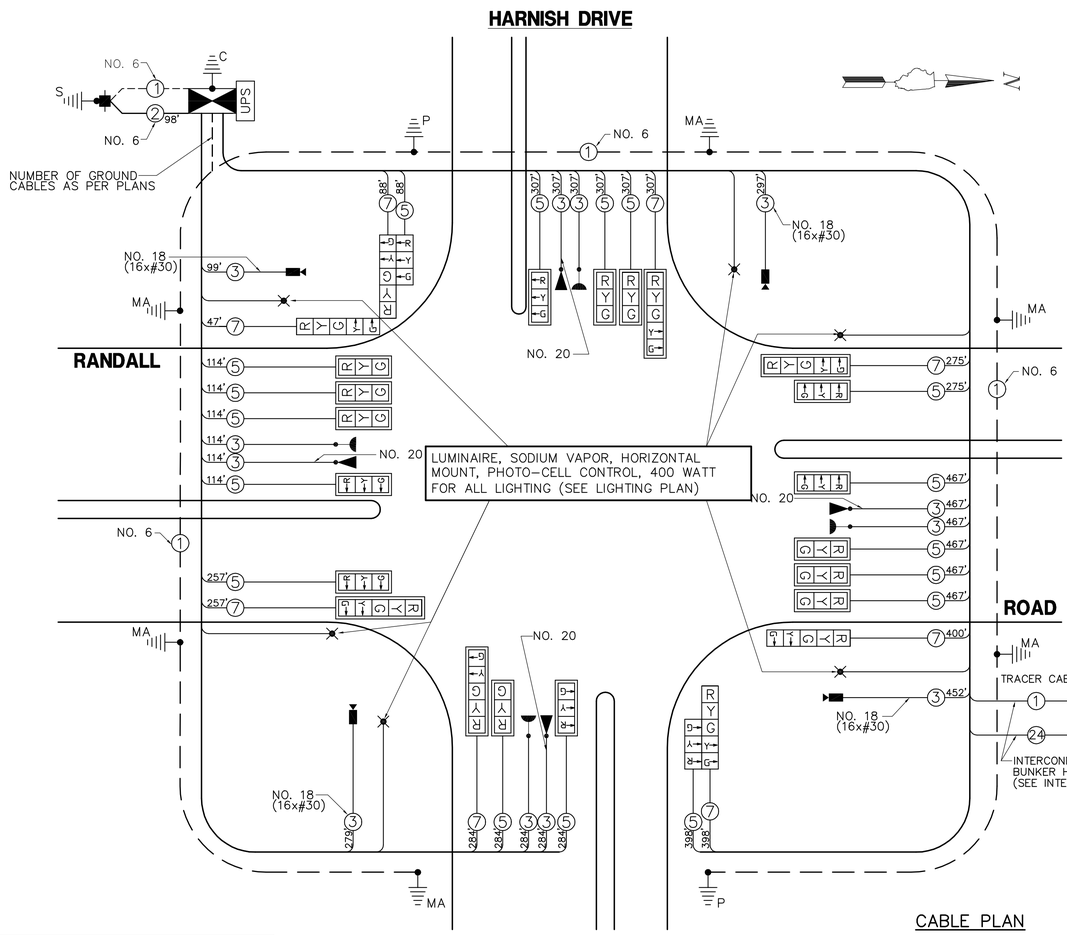
SCALE: 1"=20'

SHEET NUMBER: 12
OF 17 SHEETS

SCHEDULE OF QUANTITIES

RANDALL ROAD AT HARNISH DRIVE TRAFFIC SIGNAL MODIFICATION

NO.	QUANT.	UNIT	ITEM
1.	31.5	SQ.FT.	SIGN PANEL - TYPE 1
2.	80	FOOT	CONDUIT IN TRENCH, 2" DIA., GALVANIZED STEEL
3.	120	FOOT	CONDUIT IN TRENCH, 2-1/2" DIA., GALVANIZED STEEL
4.	83	FOOT	CONDUIT IN TRENCH, 3" DIA., GALVANIZED STEEL
5.	10	FOOT	CONDUIT IN TRENCH, 4" DIA., GALVANIZED STEEL
6.	640	FOOT	CONDUIT PUSHED, 4" DIA., GALVANIZED STEEL
7.	2	EACH	HANDHOLE
8.	2	EACH	DOUBLE HANDHOLE
9.	843	FOOT	ELECTRIC CABLE IN CONDUIT, GROUNDING, NO. 6 1C
10.	1,172	FOOT	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 3C
11.	5,115	FOOT	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 5C
12.	2,056	FOOT	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 7C
13.	98	FOOT	ELECTRIC CABLE IN CONDUIT, SERVICE, NO.6 2C
14.	1,127	FOOT	ELECTRIC CABLE IN CONDUIT, COMMUNICATION, NO. 18 (16 x#30), 3C
15.	1,172	FOOT	ELECTRIC CABLE IN CONDUIT, NO. 20 3/C, TWISTED, SHIELDED
16.	2	EACH	TRAFFIC SIGNAL POST, GALVANIZED STEEL, 16 FT
17.	2	EACH	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE, 24 FT.
18.	1	EACH	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE, 50 FT.
19.	1	EACH	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE, 55 FT.
20.	2	EACH	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE, 60 FT.
21.	8	FOOT	CONCRETE FOUNDATION, TYPE A
22.	4	FOOT	CONCRETE FOUNDATION, TYPE C
23.	4	FOOT	CONCRETE FOUNDATION, TYPE D
24.	30	FOOT	CONCRETE FOUNDATION, TYPE E 30-INCH DIAMETER
25.	30	FOOT	CONCRETE FOUNDATION, TYPE E 36-INCH DIAMETER
26.	42	FOOT	CONCRETE FOUNDATION, TYPE E 42-INCH DIAMETER (SPECIAL)
27.	15	EACH	SIGNAL HEAD, L.E.D., 1-FACE, 3-SECTION, MAST ARM MOUNTED
28.	2	EACH	SIGNAL HEAD, L.E.D., 1-FACE, 5-SECTION, BRACKET MOUNTED
29.	4	EACH	SIGNAL HEAD, L.E.D., 1-FACE, 5-SECTION, MAST ARM MOUNTED
30.	2	EACH	SIGNAL HEAD, L.E.D., 2-FACE, 1-3 SECTION, 1-5 SECTION, BRACKET MOUNTED
31.	20	EACH	TRAFFIC SIGNAL BACKPLATE
32.	4	EACH	LIGHT DETECTOR
33.	1	EACH	LIGHT DETECTOR AMPLIFIER
34.	1	EACH	FULL ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL
35.	1	EACH	TRANSCEIVER - FIBER OPTIC
36.	1	EACH	UNINTERRUTIBLE POWER SUPPLY (UPS)
37.	1	EACH	SERVICE INSTALLATION, GROUND MOUNT
38.	280	FOOT	TRENCH AND BACKFILL FOR ELECTRICAL WORK
39.	1	EACH	VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION)
40.	1	EACH	REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT
41.	5	EACH	REMOVE EXISTING HANDHOLE
42.	9	EACH	REMOVE EXISTING CONCRETE FOUNDATION
43.	1	EACH	TEMPORARY TRAFFIC SIGNAL INSTALLATION
44.	1	EACH	TEMPORARY TRAFFIC SIGNAL TIMINGS



CABLE PLAN

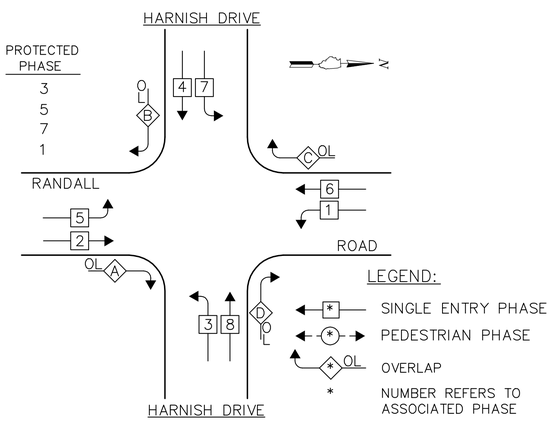
THE TRAFFIC SIGNAL CONTROL EQUIPMENT FOR THIS PROJECT SHALL BE "ECONOLITE" TO MATCH THE EXISTING ADJACENT SYSTEM.

CABLE PLAN LEGEND

EXISTING	PROPOSED	
G	G	8" TRAFFIC SIGNAL SECTION
R	R	12" TRAFFIC SIGNAL SECTION
W	W	12" PEDESTRIAN SIGNAL SECTION
		12" PEDESTRIAN SIGNAL SECTION
		CONTROLLER CABINET
		SERVICE INSTALLATION
		VEHICLE DETECTOR, INDUCTION LOOP
		MAGNETIC DETECTOR
		EMERGENCY VEHICLE LIGHT DETECTOR
		CONFIRMATION BEACON
		PUSH BUTTON DETECTOR
②	②	DENOTES NUMBER OF CONDUCTORS. ALL CABLE NO. 14 EXCEPT AS INDICATED. ALL LOOP DETECTOR CABLE TO BE SHIELDED.
		SIGNAL FACE WITH BACKPLATE. "P" INDICATES PROGRAMMED HEAD
H/C	H/C	GROUND ROD AT HANDHOLE, DOUBLE HANDHOLE OR CONTROLER
P	P	GROUND ROD AT POST OR MAST ARM POLE
S	S	GROUND ROD AT ELECTRIC SERVICE INSTALLATION
①	①	GROUND CABLE IN CONDUIT, NO.6 SOLID COPPER (GREEN)
24	24	FIBER OPTIC CABLE NO. 62.5/125 MM12F & SM12F
"E"(#)	(#)	BELDEN 8281 COAXIAL CABLE
T	T	TELEPHONE
I	I	ISDN LINE
		VIDEO DETECTION CAMERA
		PROPOSED STREET LIGHTING LUMINAIRE
		PROPOSED DOME PAN/TILT/ZOOM (PTZ) CAMERA
1st AV		PROPOSED L.E.D. ILLUMINATED STREET NAME SIGN
UPS		UNINTERRUPTIBLE POWER SUPPLY

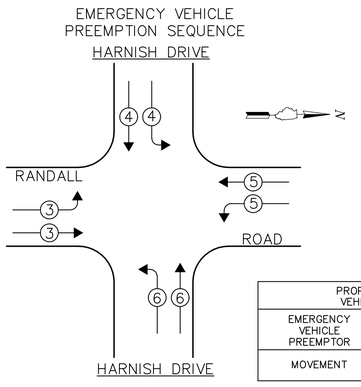
CONTROLLER SEQUENCE

OVERLAP LETTER		PERMISSIVE PHASE		PROTECTED PHASE
A	=	2	+	3
B	=	4	+	5
C	=	6	+	7
D	=	8	+	1



PHASE DESIGNATION DIAGRAM

EMERGENCY VEHICLE PREEMPTION SEQUENCE



PROPOSED EMERGENCY VEHICLE PREEMPTORS				
EMERGENCY VEHICLE PREEMPTOR	3	4	5	6
MOVEMENT				

McHENRY COUNTY DIVISION OF TRANSPORTATION TRAFFIC SIGNAL INSTALLATION ELECTRICAL SERVICE REQUIREMENTS					TOTAL WATTAGE
TYPE	NO LAMPS	WATTAGE INCAND.	WATTAGE L.E.D.	% OPERATION	
SIGNAL (RED)	26	135	17	0.50	221.0
SIGNAL (YELLOW)	26	135	25	0.25	162.5
SIGNAL (GREEN)	26	135	15	0.25	97.5
ARROW	16	135	12	0.10	19.2
PED.SIGNAL		90	25	1.00	
CONTROLLER	1	100	100	1.00	100.0
BATTERY BACKUP	1		25	1.00	25.0
VIDEO SYSTEMS	1		150	1.00	150.0
LUMINAIRE	6	400		0.50	1200.0
FLASHER				0.05	
				TOTAL =	1975.2

ENERGY COSTS – BILLED TO: VILLAGE OF ALGONQUIN
(ADDRESS) 2200 HARNISH DRIVE

ENERGY SUPPLY – CONTACT: MS. AUDREY HELGESEN
PHONE: (847) 816-5225
COMPANY: COMED-LIBERTYVILLE

Restoration of Work Area. Restoration of the traffic signal work area shall be incidental to the related pay items such as foundation, conduit, handhole, trench and backfill, etc., and no extra compensation shall be allowed. All roadway surfaces such as shoulders, medians, sidewalks, pavement, etc. shall be replaced in kind. All damage to mowed lawns shall be replaced with an approved sod, and all damage to unmowed fields shall be seeded in accordance with Standard Specifications 252 and 250 respectively.

FOUNDATION (DEPTH)	(FT.)	CABLE SLACK	(FT.)	VERTICAL	(FT.)
TYPE A – POST	4	HANDHOLE	6.5	ALL FOUNDATIONS	3.5
TYPE D – CONTROLLER	4	DOUBLE HANDHOLE	13	MAST ARM (L) POLE	20'+L-2=
TYPE E – M.ARM POLE		SIGNAL POST	2	BRACKET MOUNTED	13
30"(16'-30")	15	CONTROLLER CAB.	1	PED. PUSHBUTTON	4
30"(30'-40')	15	FIBER OPTIC	13	ELECTRIC SERVICE	13.5
36"(40'-48')	15	ELECTRIC SERVICE	1	SERVICE TO GROUND	13.5
36"(50'-55')	15	GROUND CABLE	1	POST MOUNTED	6
42"(56'-75')	21				

GEWALT HAMILTON ASSOCIATES, INC.
CONSULTING ENGINEERS & SURVEYORS
850 Forest Edge Drive Vernon Hills, IL 60061 Tel. 847.478.9700 Fax 847.478.9701

CABLE PLAN, PHASE DESIGNATION DIAGRAM AND SCHEDULE OF QUANTITIES

TRAFFIC SIGNAL MODERNIZATION PLANS
RANDALL ROAD AT HARNISH DRIVE
VILLAGE OF ALGONQUIN, ILLINOIS

NO.	BY	DATE	REVISION
3	PJS	5-8-08	PER MCDOT REVIEW AND CONNENTS (5-1-08)
2	LJD	4/25/08	PER VILLAGE REVIEW AND COMMENTS (4/7/08)
1	LJD	3/12/08	PER MCDOT REVIEW AND COMMENTS (2/22/08)

NO.	BY	DATE	REVISION

FILE: 3254-905-TR2.dwg
DRAWN BY: LJD
DATE: 12-31-07
GHA PROJECT # 3254.905
CHECKED BY: DPB
DATE: 1-25-08
SCALE: N/A
SHEET NUMBER: 13
OF 17 SHEETS

NOTES FOR TEMPORARY TRAFFIC SIGNALS

1. ALL CONTROL EQUIPMENT INCLUDING EMERGENCY PRE-EMPTION AND COMMUNICATION DEVICES FOR THE TEMPORARY TRAFFIC SIGNAL(S) SHALL BE FURNISHED BY THE CONTRACTOR.
2. ONLY CONTROLLERS SUPPLIED BY ONE OF THE DISTRICT APPROVED CLOSED LOOP EQUIPMENT MANUFACTURERS WILL BE APPROVED FOR USE AT TEMPORARY SIGNAL LOCATIONS. ALL CONTROLLERS USED FOR TEMOPRARY TRAFFIC SIGNALS SHALL BE FULLY ACTUATED NEMA MICROPROCESSOR BASED WITH RS232 DATA ENTRY PORTS COMPATIBLE WITH EXISTING MONITORING SOFTWARE APPROVED BY IDOT DISTRICT 1, INSTALLED IN A NEMA TS1 OR TS2 CABINET. ONLY ONE BRAND OF CONTROLLER WILL BE ACCEPTED FOR ANY ONE CONTRACT.
3. ALL TRAFFIC SIGNAL SECTIONS AND PEDESTRIAN SIGNAL SECTIONS SHALL BE 12". HEADS SHALL BE PLACED AS INDICATED ON THE TEMPORARY TRAFFIC SIGNAL PLAN OR AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL FURNISH ENOUGH CABLE SLACK TO RELOCATE HEADS TO ANY POSITION ON THE SPAN WIRE OR AT LOCATIONS ILLUSTRATED ON THE PLANS FOR CONSTRUCTION STAGING. THE TEMPORARY TRAFFIC SIGNAL SHALL REMAIN IN OPERATION DURING ALL SIGNAL HEAD RELOCATIONS. EACH TEMPORARY TRAFFIC SIGNAL HEAD SHALL HAVE ITS OWN CABLE FROM THE CONTROLLER CABINET TO THE SIGNAL HEAD.
4. ALL EXISTING STREET NAME AND INTERSECTION REGULATORY SIGNS SHALL BE REMOVED FROM EXISTING POLES, RELOCATED AND SECURELY FASTENED TO THE SIGNAL SPAN WIRE OR WOOD POLE AS DIRECTED BY THE ENGINEER.
5. ANY TEMPORARY SIGNAL WITHIN AN EXISTING CLOSED LOOP TRAFFIC SIGNAL SYSTEM SHALL BE INTERCONNECTED TO THAT SYSTEM USING SIMILAR BRAND CONTROL EQUIPMENT.
6. THE TEMPORARY TRAFFIC SIGNAL SHALL HAVE THE SIGNAL HEAD DISPLAYS, SIGNAL HEAD PLACEMENTS AND CONTROLLER PHASING MATCH THE EXISTING TRAFFIC SIGNAL, AT THE TIME OF THE TURN ON, IF NO TRAFFIC STAGING IS IN PLACE OR WILL NOT BE STAGED ON THE DAY OF THE TURN ON.

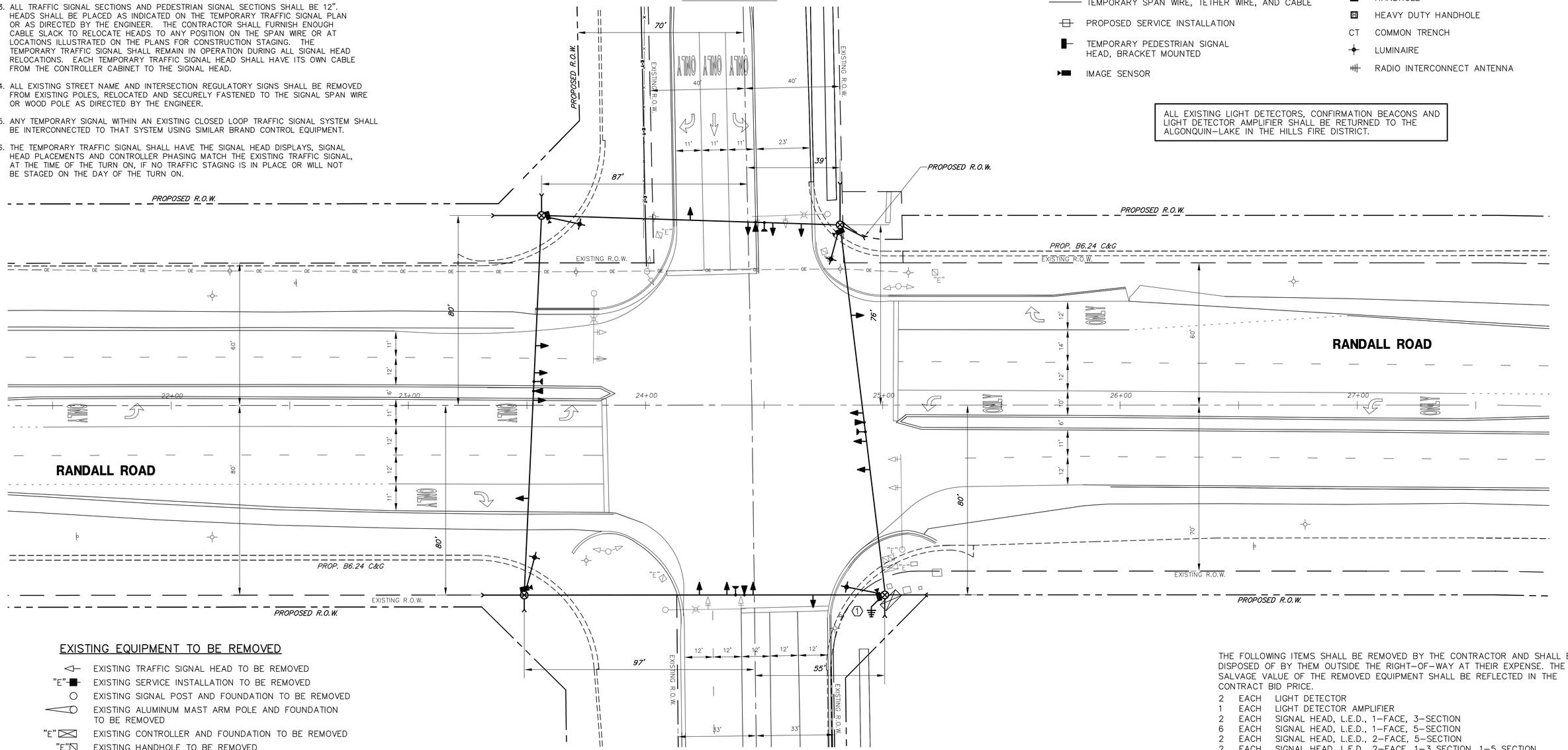
N

GRAPHIC SCALE
20 0 10 20
(IN FEET)
1 inch = 20 ft.

TEMPORARY TRAFFIC SIGNAL LEGEND

- TEMPORARY TRAFFIC SIGNAL HEAD SPAN WIRE MOUNTED ORIGINAL LOCATION
- TEMPORARY TRAFFIC SIGNAL HEAD SPAN WIRE MOUNTED SECONDARY LOCATION
- TEMPORARY WOOD POLE (CLASS 5 OR BETTER) 45 FOOT (13.7m) MINIMUM.
- TEMPORARY CONTROLLER CABINET
- TEMPORARY SPAN WIRE, TETHER WIRE, AND CABLE
- PROPOSED SERVICE INSTALLATION
- TEMPORARY PEDESTRIAN SIGNAL HEAD, BRACKET MOUNTED
- IMAGE SENSOR
- PEDESTRIAN PUSHBUTTON DETECTOR
- EMERGENCY VEHICLE LIGHT DETECTOR
- CONFIRMATION BEACON
- VEHICLE DETECTOR, INDUCTION LOOP
- UD UNIT DUCT
- G.S. CONDUIT IN TRENCH OR PUSHED
- HANDHOLE
- HEAVY DUTY HANDHOLE
- CT COMMON TRENCH
- LUMINAIRE
- RADIO INTERCONNECT ANTENNA

ALL EXISTING LIGHT DETECTORS, CONFIRMATION BEACONS AND LIGHT DETECTOR AMPLIFIER SHALL BE RETURNED TO THE ALGONQUIN-LAKE IN THE HILLS FIRE DISTRICT.



EXISTING EQUIPMENT TO BE REMOVED

- EXISTING TRAFFIC SIGNAL HEAD TO BE REMOVED
- "E" EXISTING SERVICE INSTALLATION TO BE REMOVED
- EXISTING SIGNAL POST AND FOUNDATION TO BE REMOVED
- EXISTING ALUMINUM MAST ARM POLE AND FOUNDATION TO BE REMOVED
- "E" EXISTING CONTROLLER AND FOUNDATION TO BE REMOVED
- "E" EXISTING HANDHOLE TO BE REMOVED
- EXISTING PEDESTRIAN SIGNAL HEAD TO BE REMOVED
- EXISTING PEDESTRIAN PUSHBUTTON TO BE REMOVED
- EMERGENCY VEHICLE LIGHT DETECTOR TO BE REMOVED
- CONFIRMATION BEACON TO BE REMOVED
- "E" EXISTING HEAVY-DUTY HANDHOLE TO BE REMOVED
- EXISTING STEEL MAST ARM POLE AND FOUNDATION TO BE REMOVED
- "A" ABANDONED

THE FOLLOWING EXISTING TRAFFIC SIGNAL EQUIPMENT SHALL BE REMOVED BY THE CONTRACTOR, SHALL REMAIN THE PROPERTY OF MCDOT AND SHALL BE DELIVERED, BY THE CONTRACTOR, TO MCDOT'S TRAFFIC SIGNAL MAINTENANCE CONTRACTOR'S MAIN FACILITY PER THE TRAFFIC SIGNAL SPECIFICATIONS.

1 EACH CONTROLLER AND CABINET (COMPLETE)
1 EACH VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION)
1 EACH UNINTERRUPTIBLE POWER SUPPLY (COMPLETE)

CONSTRUCTION NOTES:

(1) THE CONTRACTOR SHALL INSTALL A RADIO INTERCONNECT SYSTEM TO MAINTAIN THE EXISTING INTERCONNECT BETWEEN HARNISH DRIVE AND HUNTINGTON DRIVE/BUNKER HILL DRIVE DURING CONSTRUCTION. THE COST OF THE RADIO INTERCONNECT SHALL BE INCIDENTAL TO THE COST OF THE TEMPORARY TRAFFIC SIGNAL INSTALLATION.

THE FOLLOWING ITEMS SHALL BE REMOVED BY THE CONTRACTOR AND SHALL BE DISPOSED OF BY THEM OUTSIDE THE RIGHT-OF-WAY AT THEIR EXPENSE. THE SALVAGE VALUE OF THE REMOVED EQUIPMENT SHALL BE REFLECTED IN THE CONTRACT BID PRICE.

2 EACH LIGHT DETECTOR
1 EACH LIGHT DETECTOR AMPLIFIER
2 EACH SIGNAL HEAD, L.E.D., 1-FACE, 3-SECTION
6 EACH SIGNAL HEAD, L.E.D., 1-FACE, 5-SECTION
2 EACH SIGNAL HEAD, L.E.D., 2-FACE, 5-SECTION
2 EACH SIGNAL HEAD, L.E.D., 2-FACE, 1-3 SECTION, 1-5 SECTION
8 EACH TRAFFIC SIGNAL BACKPLATE
4 EACH STEEL COMBINATION MAST ARM ASSEMBLY AND POLE
4 EACH TRAFFIC SIGNAL POST
1 EACH SERVICE INSTALLATION

THE TRAFFIC SIGNAL CONTROL EQUIPMENT FOR THIS PROJECT SHALL BE "ECONOLITE" TO MATCH THE EXISTING ADJACENT SYSTEM.

GEWALT HAMILTON ASSOCIATES, INC.
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STAGE I - TEMPORARY TRAFFIC SIGNAL INSTALLATION

TRAFFIC SIGNAL MODERNIZATION PLANS
RANDALL ROAD AT HARNISH DRIVE
VILLAGE OF ALGONQUIN, ILLINOIS

NO.	BY	DATE	REVISION
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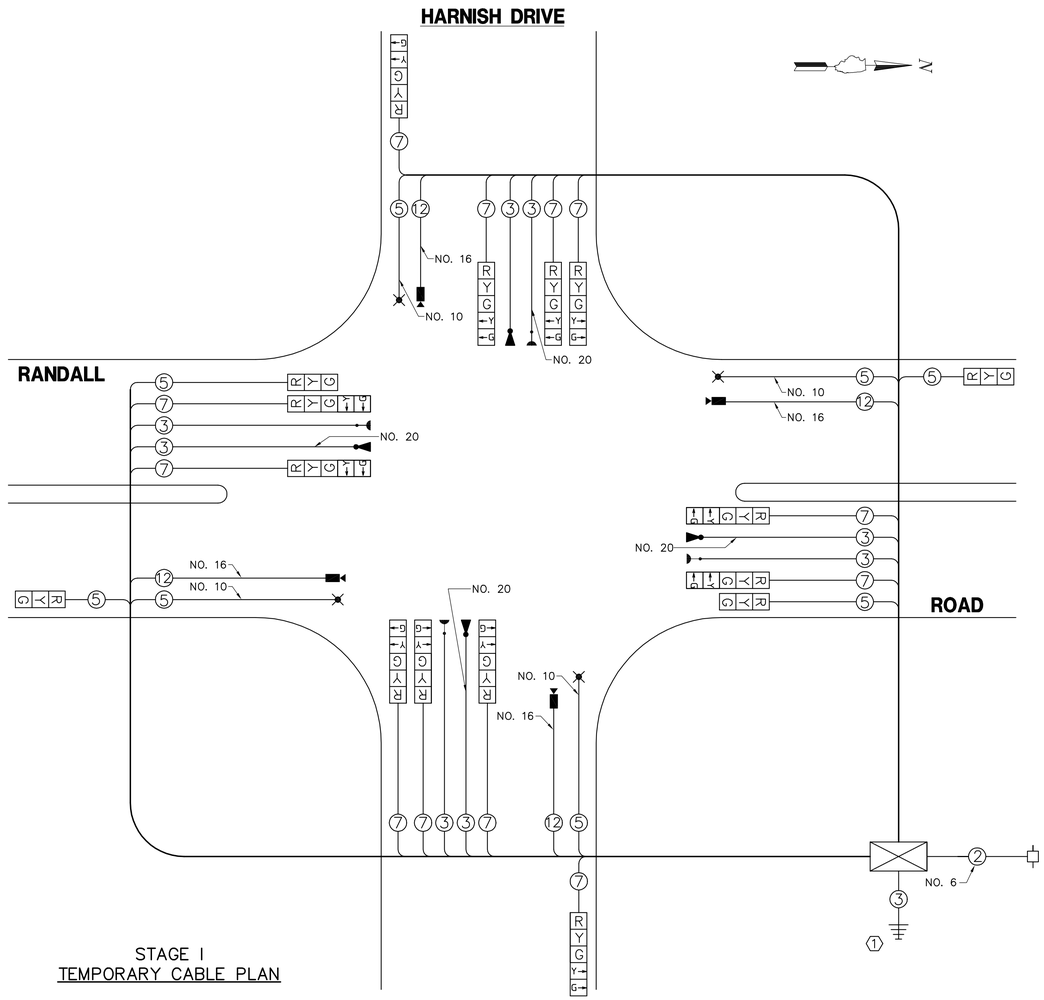
2	LJD	4/25/08	PER VILLAGE REVIEW AND COMMENTS (4/7/08)
1	LJD	3/12/08	PER MCDOT REVIEW AND COMMENTS (2/22/08)

FILE: 3254-905-TR2.dwg
DRAWN BY: LJD
DATE: 12-31-07
GHA PROJECT # 3254.905
CHECKED BY: DPB
DATE: 1-25-08
SCALE: 1"=20'
SHEET NUMBER: 7
OF 17 SHEETS



STAGE I
TEMPORARY CABLE PLAN

HARNISH DRIVE

TEMPORARY CABLE PLAN LEGEND

- TEMPORARY TRAFFIC SIGNAL SECTION OR PEDESTRIAN SIGNAL SECTION 12" (300mm)
- TEMPORARY CONTROLLER CABINET
- TEMPORARY SERVICE INSTALLATION
- (5) INDICATES NUMBER OF CONDUCTORS IN CABLE. ALL CONDUCTORS TO BE NUMBER 14 AWG WIRE UNLESS OTHERWISE NOTED.
- EMERGENCY VEHICLE LIGHT DETECTOR
- CONFIRMATION BEACON
- VEHICLE DETECTOR, INDUCTION LOOP
- PEDESTRIAN PUSHBUTTON
- 12" (300mm) PEDESTRIAN SIGNAL SECTION
- LUMINAIRE
- RADIO INTERCONNECT ANTENNA

CONSTRUCTION NOTES:

(1) THE CONTRACTOR SHALL INSTALL A RADIO INTERCONNECT SYSTEM TO MAINTAIN THE EXISTING INTERCONNECT BETWEEN HARNISH DRIVE AND HUNTINGTON DRIVE/BUNKER HILL DRIVE DURING CONSTRUCTION. THE COST OF THE RADIO INTERCONNECT SHALL BE INCIDENTAL TO THE COST OF THE TEMPORARY TRAFFIC SIGNAL INSTALLATION.

THE TRAFFIC SIGNAL CONTROL EQUIPMENT FOR THIS PROJECT SHALL BE "ECONOLITE" TO MATCH THE EXISTING ADJACENT SYSTEM.

OVERLAP LETTER		PERMISSIVE PHASE		PROTECTED PHASE
B	=	4	+	5
D	=	8	+	1

McHENRY COUNTY DIVISION OF TRANSPORTATION
TRAFFIC SIGNAL INSTALLATION
ELECTRICAL SERVICE REQUIREMENTS

TYPE	NO LAMPS	WATTAGE INCAND.	WATTAGE L.E.D.	% OPERATION	TOTAL WATTAGE
SIGNAL (RED)	16	135	17	0.50	136.0
SIGNAL (YELLOW)	16	135	25	0.25	100.0
SIGNAL (GREEN)	16	135	15	0.25	60.0
ARROW	24	135	12	0.10	28.8
PED.SIGNAL		90	25	1.00	
CONTROLLER	1	100	100	1.00	100.0
ILLUM. SIGN		84			
LUMINAIRE	4	400		0.50	800.0
VIDEO SYSTEMS	1		150	1.00	150.0
FLASHER				0.05	
				TOTAL =	1374.8

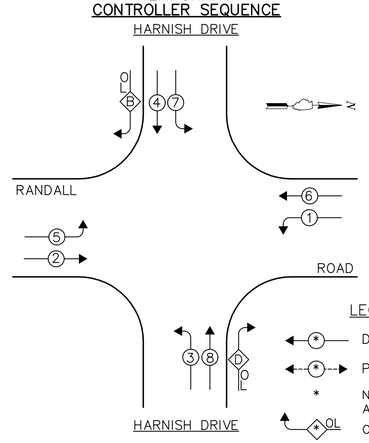
ENERGY COSTS – BILLED TO: VILLAGE OF ALGONQUIN
(ADDRESS) 2200 HARNISH DRIVE

ENERGY SUPPLY – CONTACT: MS. AUDREY HELGESEN
PHONE: (847) 816-5225
COMPANY: COMED-LIBERTYVILLE

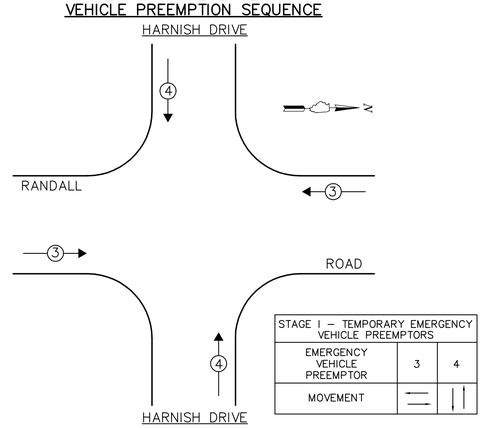
IMPORTANT NOTES:

1. ALL LABOR AND MATERIAL REQUIRED TO COMPLY WITH BOTH STAGE I AND II TEMPORARY TRAFFIC SIGNAL INSTALLATION REQUIREMENTS SHALL BE CONSIDERED INCIDENTAL TO THE PRICE OF THE TEMPORARY TRAFFIC SIGNAL INSTALLATION.
2. MULTIPLE SIGNAL HEAD ADDITIONS AND RELOCATIONS TO THIS TEMPORARY TRAFFIC SIGNAL WILL BE NECESSARY TO COMPLIMENT CONSTRUCTION SEQUENCING IN BOTH STAGE I AND II OF CONSTRUCTION. ALL LABOR AND MATERIAL NECESSARY TO PERFORM THIS WORK IN A MANNER ACCEPTABLE TO THE McHENRY COUNTY DIVISION OF TRANSPORTATION TRAFFIC ENGINEER SHALL BE CONSIDERED A PART OF THE TEMPORARY TRAFFIC SIGNAL INSTALLATION.
3. THE PROPOSED DUAL LEFT TURN LANES ON THE SOUTH LEG OF RANDALL ROAD AND BOTH LEGS OF HARNISH DRIVE SHALL BE OPENED TO TRAFFIC AS DETERMINED BY THE McHENRY COUNTY DIVISION OF TRANSPORTATION TRAFFIC ENGINEER.

STAGE I
TEMPORARY
CONTROLLER SEQUENCE



STAGE I
TEMPORARY EMERGENCY
VEHICLE PREEMPTION SEQUENCE



STAGE I
TEMPORARY PHASE DESIGNATION DIAGRAM

GEWALT HAMILTON ASSOCIATES, INC.
CONSULTING ENGINEERS & SURVEYORS
850 Forest Edge Drive Vernon Hills, IL 60061 Tel. 847.478.9700 Fax 847.478.9701

STAGE I - TEMPORARY CABLE PLAN AND PHASE DESIGNATION DIAGRAM

TRAFFIC SIGNAL MODERNIZATION PLANS
RANDALL ROAD AT HARNISH DRIVE
VILLAGE OF ALGONQUIN, ILLINOIS

NO.	BY	DATE	REVISION
3	PJS	5-8-08	PER MCDOT REVIEW AND CONNENTS (5-1-08)
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1	LJD	3/12/08	PER MCDOT REVIEW AND COMMENTS (2/22/08)

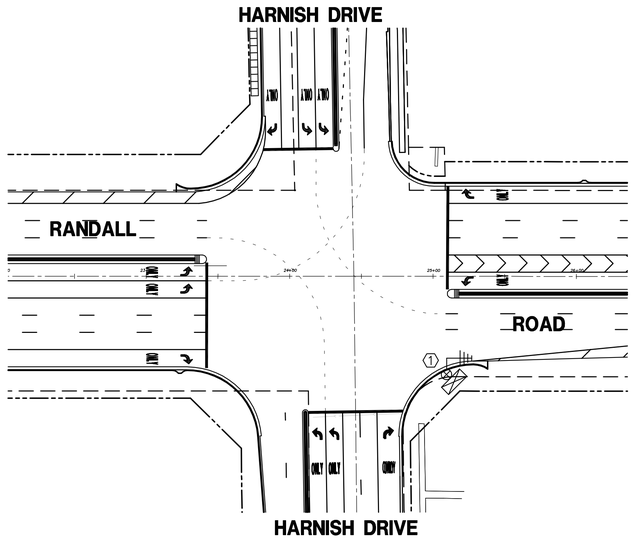
NO.	BY	DATE	REVISION

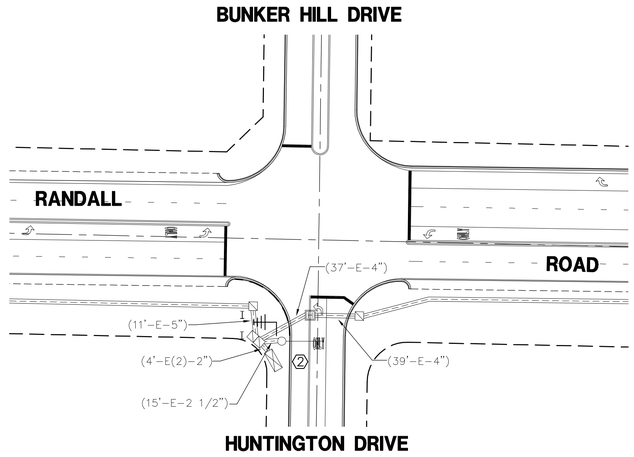
FILE: 3254-905-TR2.dwg
DRAWN BY: LJD
DATE: 12-31-07
GHA PROJECT # 3254.905
CHECKED BY: DPB
DATE: 1-25-08
SCALE: N/A

SHEET NUMBER: 8 OF 17 SHEETS

INTERCONNECT SCHEMATIC LEGEND

EXISTING INTERSECTION CONTROLLER	
PROPOSED INTERSECTION CONTROLLER	
EXISTING MASTER CONTROLLER	EMC
PROPOSED MASTER CONTROLLER	MC
MASTER MASTER CONTROLLER	MMC
EXISTING INTERSECTION & SAMPLING (SYSTEM) DETECTORS	
PROPOSED INTERSECTION & SAMPLING (SYSTEM) DETECTORS	
EXISTING INTERSECTION LOOP DETECTORS PROPOSED SAMPLING (SYSTEM) DETECTORS	P
EXISTING SAMPLING (SYSTEM) DETECTORS	ES
PROPOSED SAMPLING (SYSTEM) DETECTORS	PS
EXISTING SAMPLING (SYSTEM) DETECTORS. PROPOSED INTERSECTION AND SAMPLING (SYSTEM) DETECTORS	ESP
EXISTING SAMPLING (SYSTEM) DETECTORS PROPOSED SAMPLING (SYSTEM) DETECTORS	ESPS
EXISTING PREFORMED INTERSECTION & SAMPLING (SYSTEM) DETECTORS	PD
PROPOSED PREFORMED INTERSECTION & SAMPLING (SYSTEM) DETECTORS	PD
EXISTING SAMPLING (SYSTEM) PREFORMED DETECTORS	ESPD
PROPOSED SAMPLING (SYSTEM) PREFORMED DETECTORS	PSPD
EXISTING FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, MM12F SM12F	24
PROPOSED FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, MM12F SM12F	24
EXISTING INTERCONNECT CABLE – NO. 62.5/125 12F FIBER OPTIC CABLE	12
PROPOSED FIBER OPTIC CABLE IN CONDUIT, 62.5/125 12F FIBER OPTIC CABLE	12
EXISTING INTERCONNECT CABLE – NO. 18 3 PAIR TWISTED, SHIELDED	6
PROPOSED INTERCONNECT CABLE – NO. 18 3 PAIR TWISTED, SHIELDED	6
EXISTING LOOP DETECTOR CABLE 2/C TWISTED, SHIELDED	2
PROPOSED LOOP DETECTOR CABLE 2/C TWISTED, SHIELDED	2
EXISTING ELECTRIC CABLE, 1/C (AS SPECIFIED)	1
PROPOSED ELECTRIC CABLE, 1/C (AS SPECIFIED)	1
EXISTING TELEPHONE CONNECTION	T
PROPOSED TELEPHONE CONNECTION	T
RADIO INTERCONNECT ANTENNA	
PROPOSED COAXIAL CABLE	C





GRAPHIC SCALE

50 0 25 50

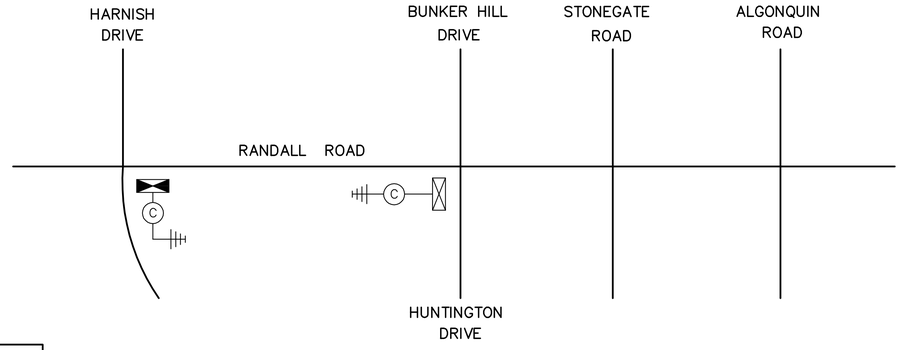
(IN FEET)

1 inch = 50 ft.

CONSTRUCTION NOTES:

1. THE TEMPORARY DISCONNECT OF THE EXISTING MCDOT INTERCONNECT SYSTEM WILL BE COORDINATED WITH THE TEMPORARY TRAFFIC SIGNAL TURN–ON AT RANDALL ROAD AND HARNISH DRIVE BY THE CONTRACTOR WITH THE MCDOT ENGINEER AND MCDOT MAINTENANCE CONTRACTOR.

2. MAINTENANCE OF THE EXISTING TRAFFIC SIGNAL INSTALLATION AT RANDALL ROAD AND BUNKER HILL DRIVE/HUNTINGTON DRIVE WILL BE REQUIRED AT THE TEMPORARY TRAFFIC SIGNAL TURN–ON AT RANDALL ROAD AND HARNISH DRIVE.



THE TRAFFIC SIGNAL CONTROL EQUIPMENT FOR THIS PROJECT SHALL BE "ECONOLITE" TO MATCH THE EXISTING ADJACENT SYSTEM.

Restoration of Work Area. Restoration of the traffic signal work area shall be incidental to the related pay items such as foundation, conduit, handhole, trench and backfill, etc., and no extra compensation shall be allowed. All roadway surfaces such as shoulders, medians, sidewalks, pavement, etc. shall be replaced in kind. All damage to mowed lawns shall be replaced with an approved sod, and all damage to unmowed fields shall be seeded in accordance with Standard Specifications 252 and 250 respectively.

INTERCONNECT PLAN LEGEND

	PROPOSED	EXISTING
CONTROLLER		
HANDHOLE		
DOUBLE HANDHOLE		
HEAVY–DUTY HANDHOLE	H	H
G.S. CONDUIT IN TRENCH (T) OR PUSHED (P)		
DETECTOR LOOP		
UNIT DUCT	*U.D.*	
SYSTEM	S	
INTERSECTION	IP	I

GEWALT HAMILTON ASSOCIATES, INC.
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TEMPORARY INTERCONNECT PLAN AND SCHEMATIC

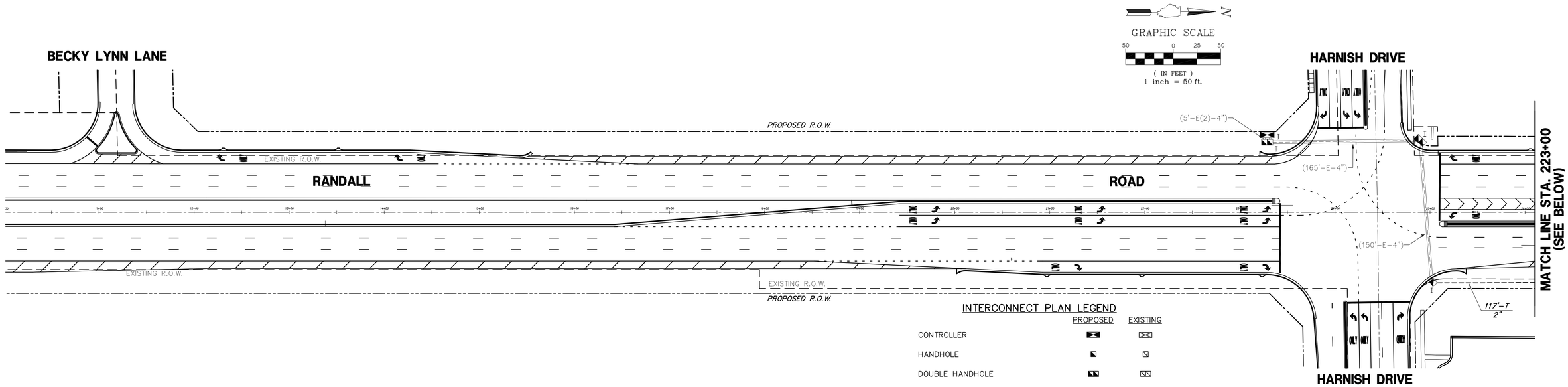
TRAFFIC SIGNAL MODERNIZATION PLANS
RANDALL ROAD AT HARNISH DRIVE
VILLAGE OF ALGONQUIN, ILLINOIS

NO.	BY	DATE	REVISION
3	PJS	5–8–08	PER MCDOT REVIEW AND CONNENTS (5–1–08)
2	LJD	4/25/08	PER VILLAGE REVIEW AND COMMENTS (4/7/08)
1	LJD	3/12/08	PER MCDOT REVIEW AND COMMENTS (2/22/08)

NO.	BY	DATE	REVISION

FILE: 3254–905–TR2.dwg
DRAWN BY: LJD DATE: 12–31–07
GHA PROJECT # 3254.905
CHECKED BY: DPB DATE: 1–25–08
SCALE: 1"=50'

SHEET NUMBER: 14 OF 17 SHEETS



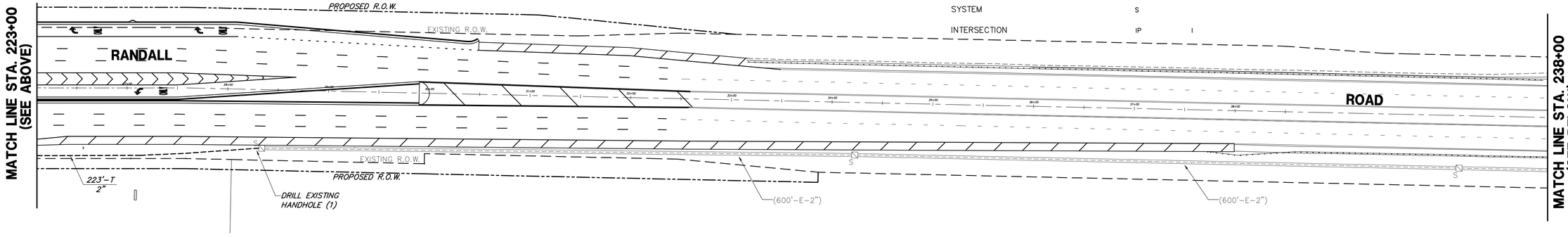
GRAPHIC SCALE

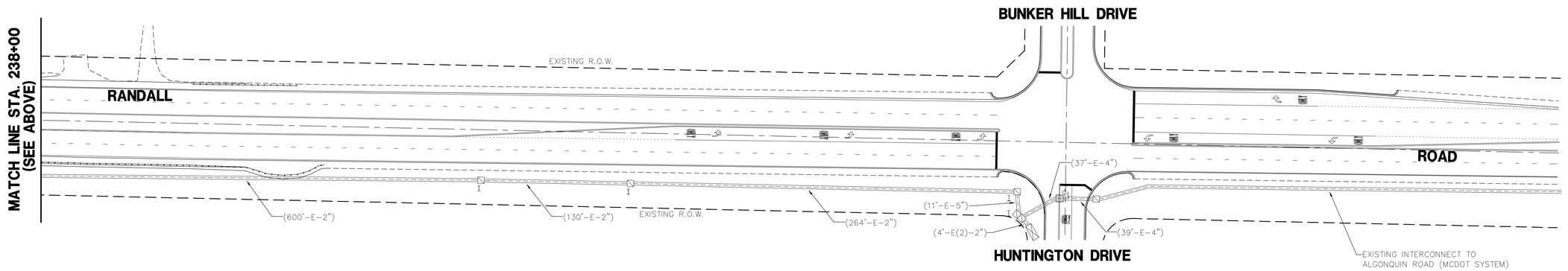
50 0 25 50

(IN FEET)
1 inch = 50 ft.

INTERCONNECT PLAN LEGEND

	PROPOSED	EXISTING
CONTROLLER		
HANDHOLE		
DOUBLE HANDHOLE		
HEAVY-DUTY HANDHOLE		
G.S. CONDUIT IN TRENCH (T) OR PUSHED (P)	-------	═══
DETECTOR LOOP		
UNIT DUCT	u.d.	
SYSTEM	S	
INTERSECTION	IP	I





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INTERCONNECT PLAN

TRAFFIC SIGNAL MODERNIZATION PLANS
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NO.	BY	DATE	REVISION

FILE: 3254-905-TR2.dwg

DRAWN BY: LJD
DATE: 12-31-07

GHA PROJECT # 3254.905

CHECKED BY: DPB
DATE: 1-25-08

SCALE: 1"=50'

SHEET NUMBER: 15
OF 17 SHEETS

INTERCONNECT SCHEMATIC LEGEND

- EXISTING INTERSECTION CONTROLLER
- PROPOSED INTERSECTION CONTROLLER
- EXISTING MASTER CONTROLLER — EMC
- PROPOSED MASTER CONTROLLER — MC
- MASTER MASTER CONTROLLER — MMC
- EXISTING INTERSECTION & SAMPLING (SYSTEM) DETECTORS
- PROPOSED INTERSECTION & SAMPLING (SYSTEM) DETECTORS
- EXISTING INTERSECTION LOOP DETECTORS PROPOSED SAMPLING (SYSTEM) DETECTORS — P
- EXISTING SAMPLING (SYSTEM) DETECTORS — ES
- PROPOSED SAMPLING (SYSTEM) DETECTORS — PS
- EXISTING SAMPLING (SYSTEM) DETECTORS. PROPOSED INTERSECTION AND SAMPLING (SYSTEM) DETECTORS — ESP
- EXISTING SAMPLING (SYSTEM) DETECTORS PROPOSED SAMPLING (SYSTEM) DETECTORS — ESPS
- EXISTING PREFORMED INTERSECTION & SAMPLING (SYSTEM) DETECTORS — PD
- PROPOSED PREFORMED INTERSECTION & SAMPLING (SYSTEM) DETECTORS — PD
- EXISTING SAMPLING (SYSTEM) PREFORMED DETECTORS — ESPD
- PROPOSED SAMPLING (SYSTEM) PREFORMED DETECTORS — PSPD
- EXISTING FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, MM12F SM12F — 24
- PROPOSED FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, MM12F SM12F — 24
- EXISTING INTERCONNECT CABLE – NO. 62.5/125 12F FIBER OPTIC CABLE — 12
- PROPOSED FIBER OPTIC CABLE IN CONDUIT, 62.5/125 12F FIBER OPTIC CABLE — 12
- EXISTING INTERCONNECT CABLE – NO. 18 3 PAIR TWISTED, SHIELDED — 6
- PROPOSED INTERCONNECT CABLE – NO. 18 3 PAIR TWISTED, SHIELDED — 6
- EXISTING LOOP DETECTOR CABLE 2/C TWISTED, SHIELDED — 2
- PROPOSED LOOP DETECTOR CABLE 2/C TWISTED, SHIELDED — 2
- EXISTING ELECTRIC CABLE, 1/C (AS SPECIFIED) — 1
- PROPOSED ELECTRIC CABLE, 1/C (AS SPECIFIED) — 1
- EXISTING TELEPHONE CONNECTION — T
- PROPOSED TELEPHONE CONNECTION — T

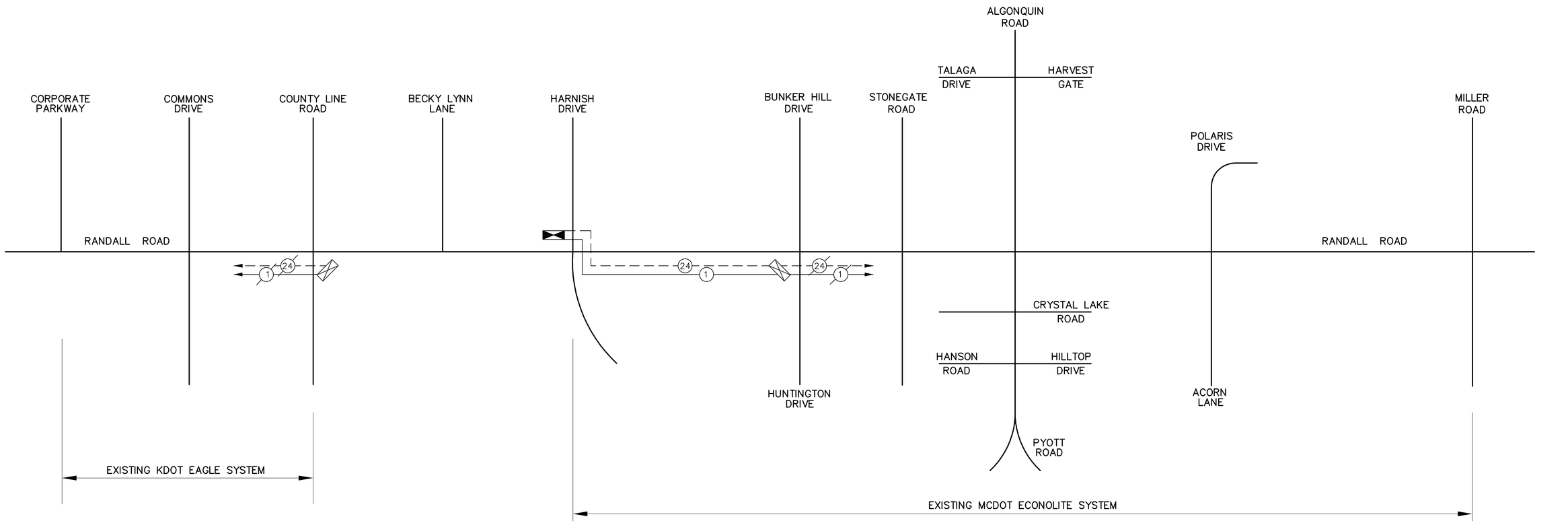
N

SCHEDULE OF QUANTITIES

RANDALL ROAD - HARNISH DRIVE TO BUNKER HILL DR./HUNTINGTON DR.

NO.	QUANT.	UNIT	ITEM
1.	1	L.SUM	TRAFFIC CONTROL AND PROTECTION, STANDARD 701601-04
2.	1	L.SUM	TRAFFIC CONTROL AND PROTECTION, STANDARD 701606-04
3.	1	L.SUM	TRAFFIC CONTROL AND PROTECTION, STANDARD 701701-04
4.	340	FOOT	CONDUIT IN TRENCH, 2" DIA., GALVANIZED STEEL
5.	2,952	FOOT	ELECTRIC CABLE IN CONDUIT, TRACER NO. 14 1C
6.	2,952	FOOT	FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, MM12F, SM12F
7.	1	EACH	DRILL EXISTING HANDHOLE
8.	340	FOOT	TRENCH AND BACKFILL FOR ELECTRICAL WORK
9.	1	EACH	RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM - LEVEL II
10.	1	EACH	MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION
11.	4,418	FOOT	REMOVE ELECTRICAL CABLE FROM CONDUIT

THE TRAFFIC SIGNAL CONTROL EQUIPMENT FOR THIS PROJECT SHALL BE "ECONOLITE" TO MATCH THE EXISTING ADJACENT SYSTEM.



GEWALT HAMILTON ASSOCIATES, INC.
CONSULTING ENGINEERS & SURVEYORS
850 Forest Edge Drive Vernon Hills, IL 60061 Tel. 847.478.9700 Fax 847.478.9701

INTERCONNECT PLAN SCHEMATIC

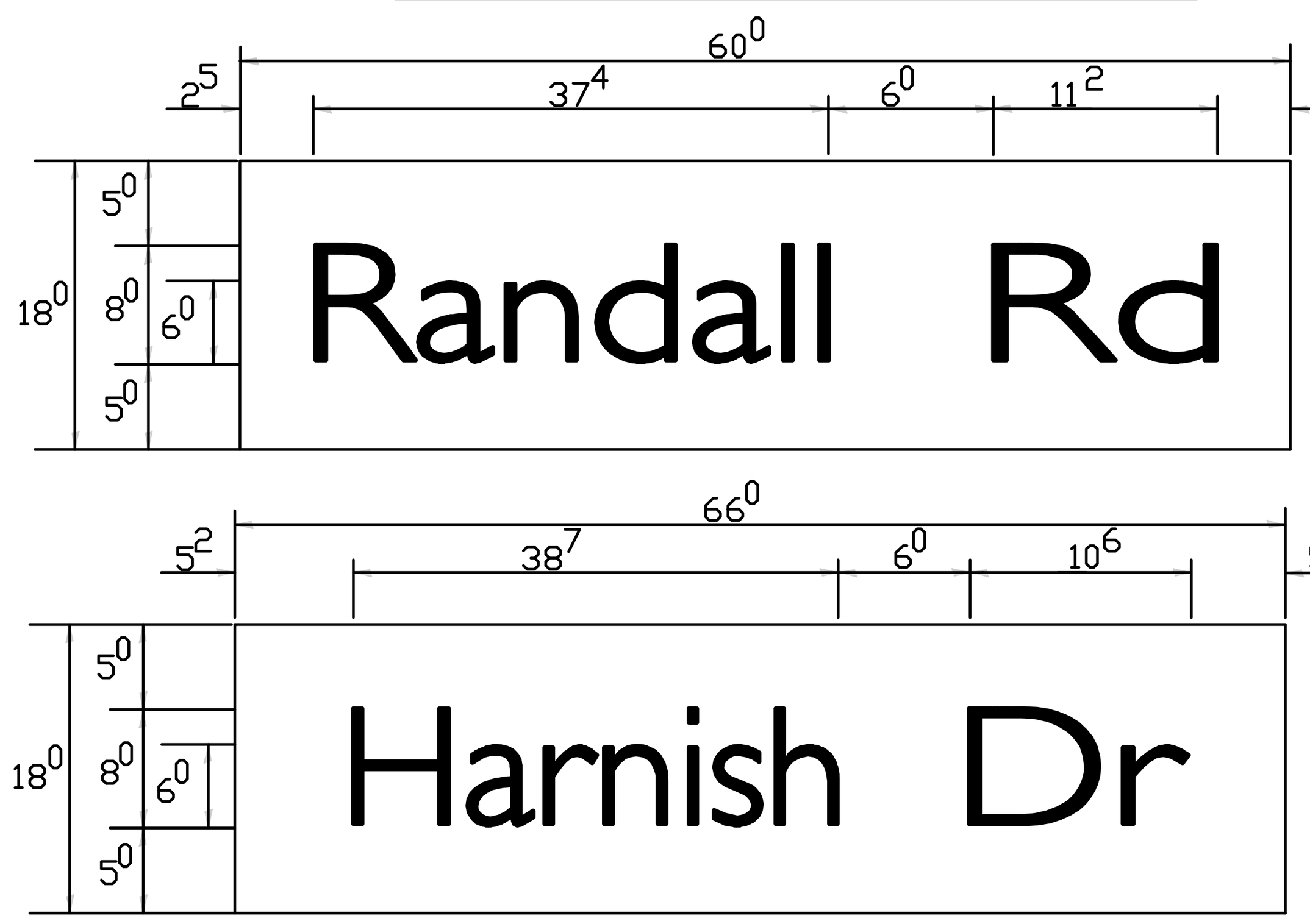
TRAFFIC SIGNAL MODERNIZATION PLANS
RANDALL ROAD AT HARNISH DRIVE
VILLAGE OF ALGONQUIN, ILLINOIS

NO.	BY	DATE	REVISION
3	PJS	5-8-08	PER MCDOT REVIEW AND CONNENTS (5-1-08)
2	LJD	4/25/08	PER VILLAGE REVIEW AND COMMENTS (4/7/08)
1	LJD	3/12/08	PER MCDOT REVIEW AND COMMENTS (2/22/08)

FILE: 3254-905-TR2.dwg
DRAWN BY: LJD
DATE: 12-31-07
GHA PROJECT # 3254.905
CHECKED BY: DPB
DATE: 1-25-08
SCALE: N/A

SHEET NUMBER: 16 OF 17 SHEETS

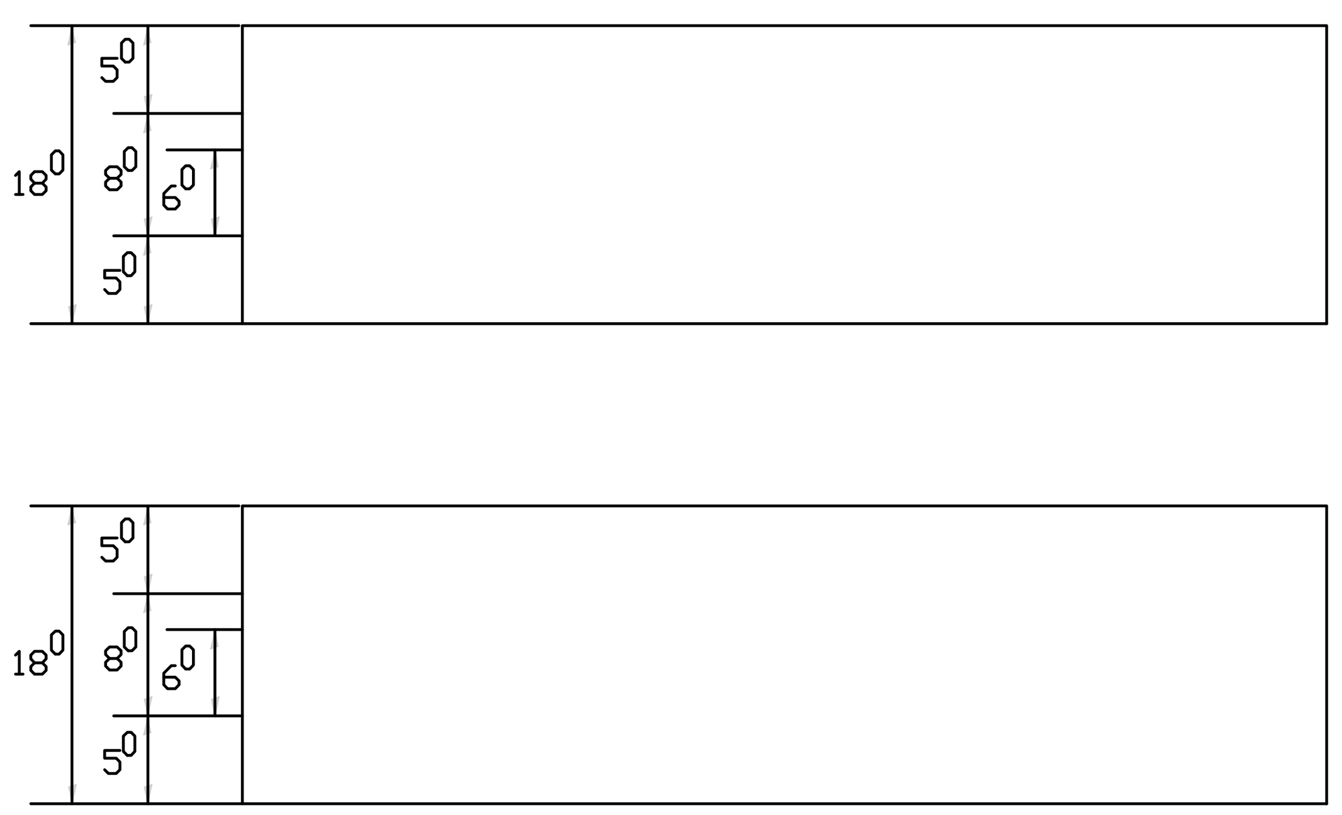
PANEL SIGN DESIGN TYPE 1



___ Sq. M. each
7.5 Sq. Ft. each
2 Required
Design Series 3-W

___ Sq. M. each
8.25 Sq. Ft. each
2 Required
Design Series 3-W

NOTE: CLEARVIEW HIGHWAY FONT IS REQUIRED FOR ALL MAST ARM MOUNTED STREET NAME SIGNS

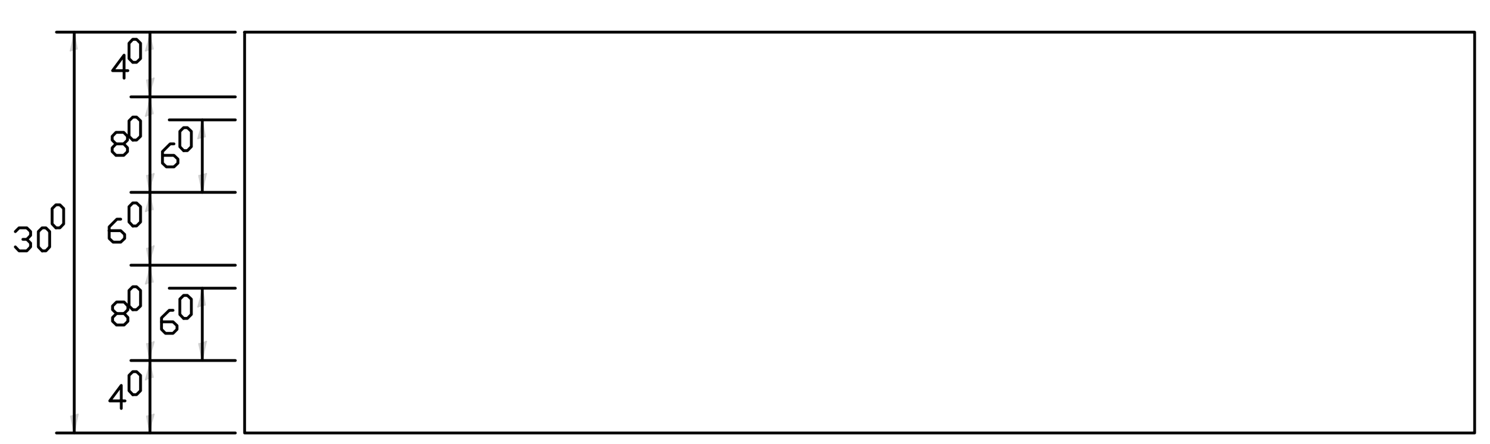


___ Sq. M. each
___ Sq. Ft. each
___ Required
Design Series __

___ Sq. M. each
___ Sq. Ft. each
___ Required
Design Series __

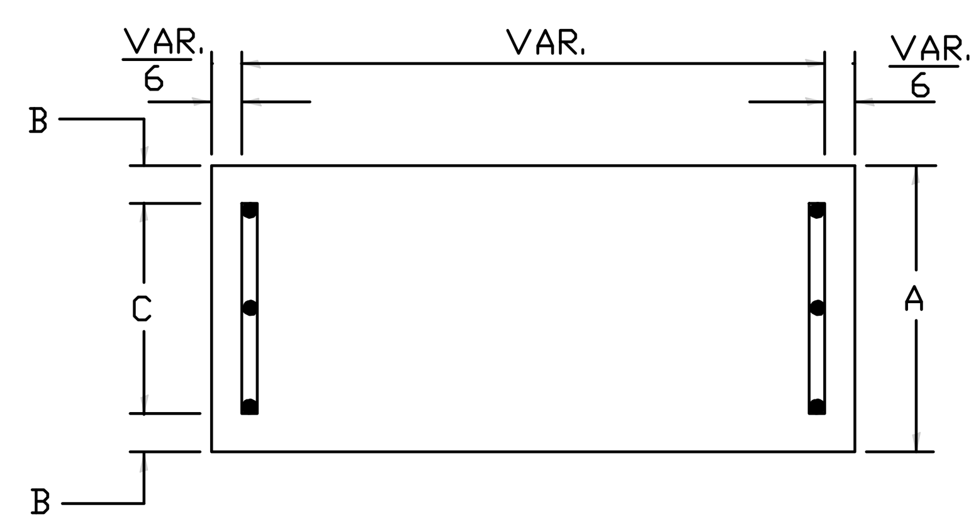
NOTE: SIGN DIMENSIONS ARE IN ENGLISH UNITS

PANEL SIGN DESIGN TYPE 2

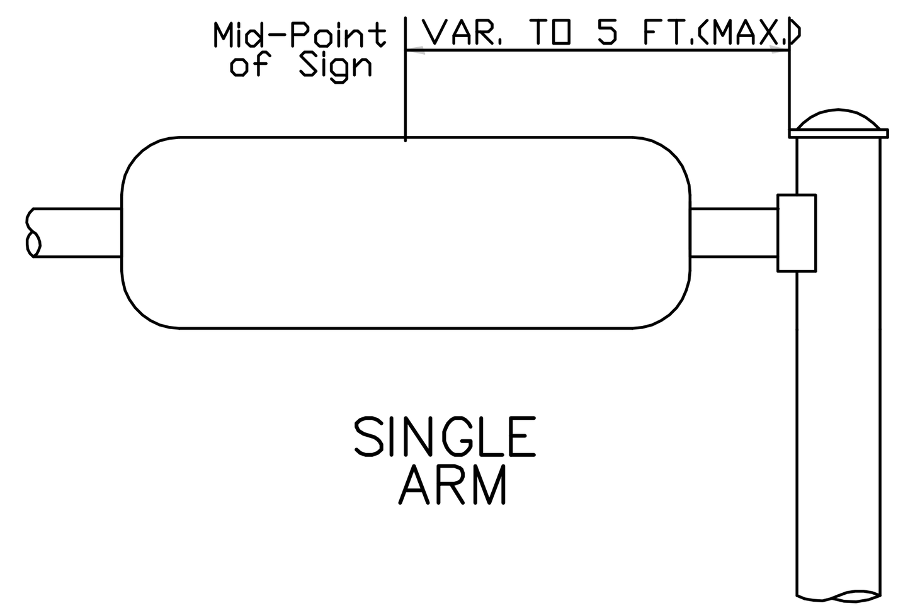


___ Sq. M. each
___ Sq. Ft. each
___ Required
Design Series __

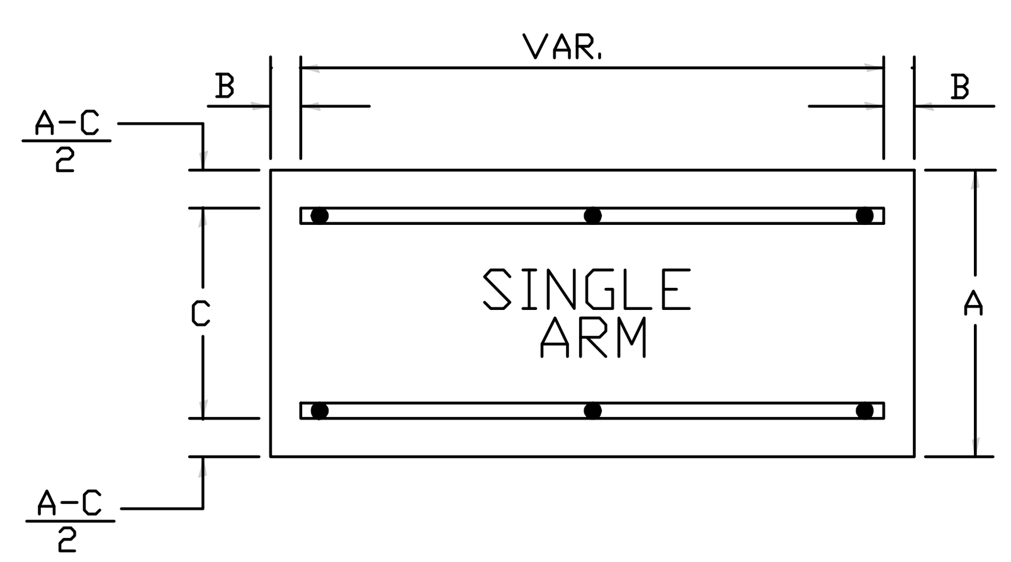
SUPPORTING CHANNELS



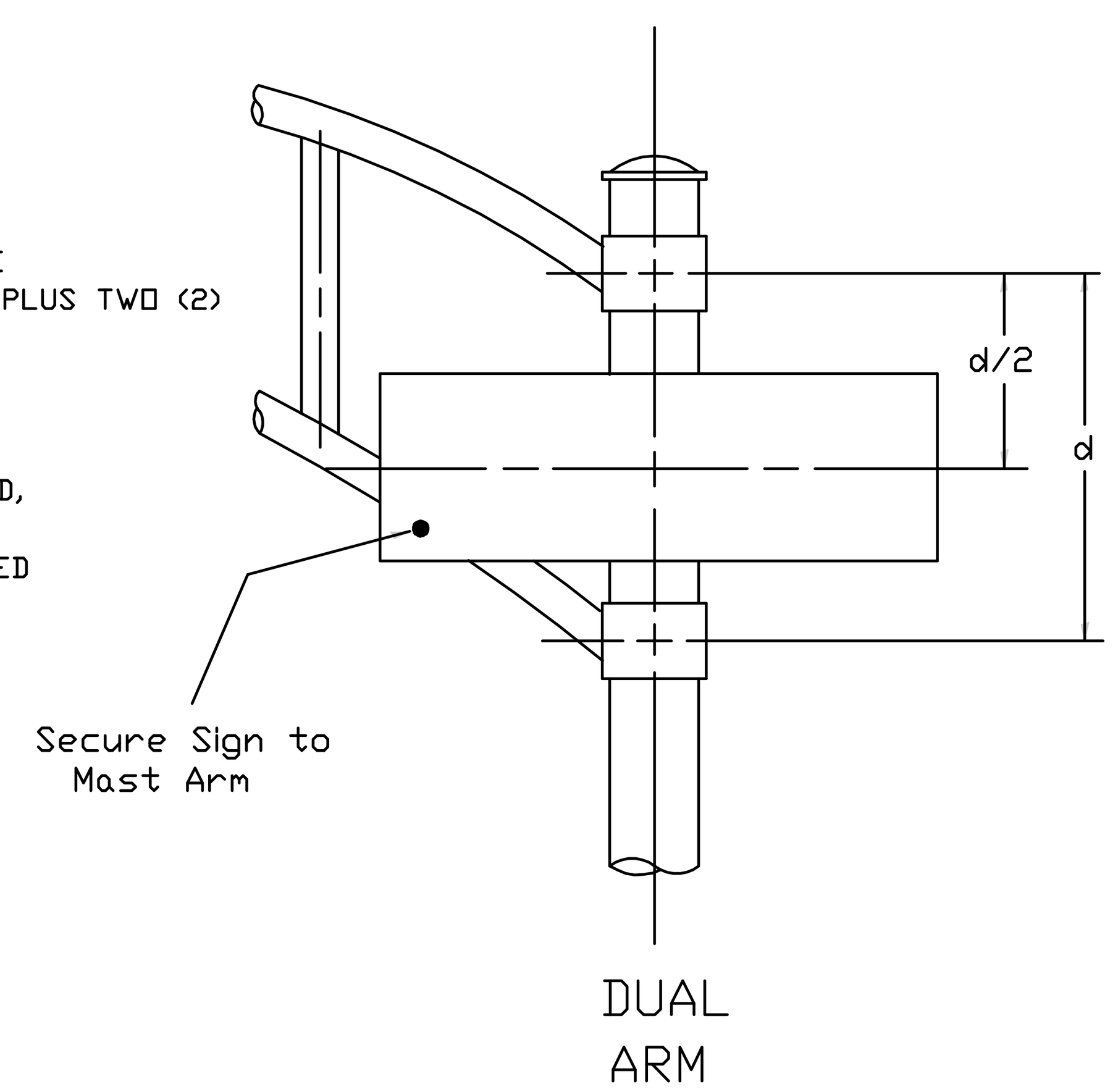
A	B	C
18″	2″	14″



SUPPORTING CHANNELS



A	B	C
18″	2″	12″
30″	2″	22″



SIGNFIX ALUMINUM CHANNEL FRAMING SYSTEM
Shall be used. See Note #5.

EXAMPLE, 2^{3} DENOTES $2\frac{3''}{8}$

Upper Case To Lower Case Spacing Chart 8-6 Inch Series "C & D"

FIRST LETTER	acde goq		bhikl mnpru		f w		j		s t		v y		x		z	
SERIES	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
A W X	1^{2}	1^{4}	1^{4}	1^{5}	1^{2}	1^{4}	0^{6}	1^{0}	1^{1}	1^{4}	0^{6}	1^{0}	1^{1}	1^{2}	1^{2}	1^{4}
B	1^{4}	1^{5}	2^{0}	2^{1}	1^{4}	1^{5}	1^{1}	1^{2}	1^{4}	1^{5}	1^{2}	1^{4}	1^{2}	1^{4}	1^{6}	1^{7}
C E G	1^{4}	1^{5}	2^{0}	2^{1}	1^{2}	1^{4}	0^{6}	1^{0}	1^{2}	1^{4}	1^{2}	1^{4}	1^{4}	1^{5}	1^{4}	1^{5}
D O Q R	1^{4}	1^{5}	2^{0}	2^{1}	1^{4}	1^{5}	0^{6}	1^{0}	1^{2}	1^{4}	1^{2}	1^{4}	1^{4}	1^{5}	1^{4}	1^{5}
F	0^{5}	0^{6}	1^{4}	1^{5}	0^{6}	1^{0}	0^{5}	0^{6}	0^{6}	1^{0}	0^{6}	1^{0}	0^{6}	1^{0}	1^{1}	1^{2}
H I M N	2^{0}	2^{1}	2^{2}	2^{4}	2^{0}	2^{1}	1^{4}	1^{5}	1^{6}	1^{7}	1^{6}	1^{7}	2^{0}	2^{1}	2^{0}	2^{1}
J U	2^{0}	2^{1}	2^{0}	2^{1}	1^{6}	1^{7}	1^{4}	1^{5}	1^{6}	1^{7}	1^{6}	1^{7}	1^{6}	1^{7}	2^{0}	2^{1}
K L	1^{1}	1^{2}	1^{6}	1^{7}	1^{1}	1^{2}	0^{5}	0^{6}	1^{1}	1^{2}	1^{1}	1^{2}	1^{1}	1^{2}	1^{2}	1^{4}
P	1^{2}	1^{4}	1^{4}	1^{5}	1^{2}	1^{4}	0^{5}	0^{6}	1^{1}	1^{2}	1^{1}	1^{2}	1^{2}	1^{4}	1^{2}	1^{4}
S	1^{2}	1^{4}	1^{6}	1^{7}	1^{2}	1^{4}	0^{6}	1^{0}	1^{2}	1^{4}	1^{2}	1^{4}	1^{2}	1^{4}	1^{2}	1^{4}
T	1^{1}	1^{2}	1^{6}	1^{7}	0^{6}	1^{0}	0^{6}	1^{0}	1^{1}	1^{2}	1^{1}	1^{2}	1^{1}	1^{2}	1^{2}	1^{4}
V	0^{6}	1^{0}	1^{4}	1^{5}	1^{1}	1^{2}	0^{6}	1^{0}	1^{2}	1^{4}	1^{2}	1^{4}	1^{2}	1^{4}	1^{2}	1^{4}
Y	0^{5}	0^{6}	1^{4}	1^{5}	0^{6}	1^{0}	0^{5}	0^{6}	0^{5}	0^{7}	0^{5}	0^{6}	0^{6}	1^{0}	1^{1}	1^{2}
Z	1^{6}	1^{7}	2^{2}	2^{4}	1^{6}	1^{7}	1^{2}	1^{4}	1^{6}	1^{7}	1^{6}	1^{7}	1^{6}	1^{7}	2^{0}	2^{1}

(SECOND LETTER across the top)

Lower Case To Lower Case Spacing Chart 6 Inch Series "C & D"

FIRST LETTER	acde goq		bhikl mnpru		f w		j		s t		v y		x		z	
SERIES	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
adhgij lmnqu	1^{6}	1^{7}	2^{2}	2^{4}	1^{6}	1^{7}	1^{2}	1^{4}	1^{4}	1^{5}	1^{4}	1^{5}	1^{6}	1^{7}	1^{6}	1^{7}
bfkops	1^{2}	1^{4}	1^{6}	1^{7}	1^{1}	1^{2}	0^{5}	0^{6}	1^{1}	1^{2}	1^{1}	1^{2}	1^{2}	1^{4}	1^{2}	1^{4}
c e	1^{2}	1^{4}	1^{6}	1^{7}	1^{2}	1^{4}	0^{6}	1^{0}	1^{2}	1^{4}	1^{2}	1^{4}	1^{2}	1^{4}	1^{2}	1^{4}
r	0^{6}	1^{0}	1^{2}	1^{4}	0^{6}	1^{0}	0^{3}	0^{3}	0^{5}	0^{6}	0^{5}	0^{6}	0^{6}	1^{0}	0^{6}	1^{0}
t z	1^{2}	1^{4}	1^{6}	1^{7}	1^{2}	1^{4}	0^{6}	1^{0}	1^{1}	1^{2}	1^{1}	1^{2}	1^{2}	1^{4}	1^{2}	1^{4}
v y	1^{1}	1^{2}	1^{4}	1^{5}	1^{1}	1^{2}	0^{5}	0^{6}	0^{6}	1^{0}	0^{6}	1^{0}	1^{1}	1^{2}	1^{1}	1^{2}
w	1^{1}	1^{2}	1^{4}	1^{5}	1^{1}	1^{2}	0^{5}	0^{6}	1^{1}	1^{2}	1^{1}	1^{2}	1^{1}	1^{2}	1^{2}	1^{4}
x	1^{2}	1^{4}	1^{6}	1^{7}	1^{1}	1^{2}	0^{5}	0^{6}	1^{1}	1^{2}	1^{1}	1^{2}	1^{1}	1^{2}	1^{2}	1^{4}

(SECOND LETTER across the top)

Number To Number Spacing Chart 8 Inch Series "C & D"

FIRST NUMBER	0		1		2		3		4		5		6		7		8		9	
SERIES	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
0 9	1^{6}	1^{7}	1^{6}	1^{7}	1^{4}	1^{5}	1^{2}	1^{4}	1^{4}	1^{5}	1^{4}	1^{5}	1^{6}	1^{7}	1^{2}	1^{4}	1^{6}	1^{7}	1^{6}	1^{7}
1	2^{0}	2^{1}	2^{0}	2^{1}	2^{0}	2^{1}	1^{6}	1^{7}	1^{4}	1^{5}	2^{0}	2^{1}	2^{0}	2^{1}	1^{4}	1^{5}	2^{0}	2^{1}	2^{0}	2^{1}
2 3 4	1^{4}	1^{5}	1^{4}	1^{5}	1^{4}	1^{5}	1^{2}	1^{4}	1^{2}	1^{4}	1^{4}	1^{5}	1^{4}	1^{5}	1^{1}	1^{2}	1^{6}	1^{7}	1^{4}	1^{5}
5	1^{4}	1^{5}	1^{4}	1^{5}	1^{4}	1^{5}	1^{1}	1^{2}	1^{1}	1^{2}	1^{4}	1^{5}	1^{4}	1^{5}	1^{1}	1^{2}	1^{4}	1^{5}	1^{4}	1^{5}
6	1^{6}	1^{7}	1^{4}	1^{5}	1^{4}	1^{5}	1^{2}	1^{5}	1^{2}	1^{4}	1^{4}	1^{5}	1^{4}	1^{5}	1^{1}	1^{2}	1^{4}	1^{5}	1^{4}	1^{5}
7	1^{2}	1^{4}	1^{2}	1^{4}	1^{4}	1^{5}	1^{2}	1^{5}	0^{5}	0^{6}	1^{2}	1^{4}	1^{4}	1^{5}	1^{1}	1^{2}	1^{4}	1^{5}	1^{2}	1^{4}
8	1^{6}	1^{7}	1^{6}	1^{7}	1^{4}	1^{5}	1^{2}	1^{5}	1^{2}	1^{4}	1^{4}	1^{5}	1^{6}	1^{7}	1^{2}	1^{4}	1^{6}	1^{7}	1^{4}	1^{5}

(SECOND NUMBER across the top)

UPPER AND LOWER CASE LETTER WIDTHS

LETTERS	6 INCH UPPER CASE LETTERS SERIES C	6 INCH UPPER CASE LETTERS SERIES D	8 INCH UPPER CASE LETTERS SERIES C	8 INCH UPPER CASE LETTERS SERIES D	LETTERS	6 INCH LOWER CASE LETTERS SERIES C	6 INCH LOWER CASE LETTERS SERIES D
A	3^{6}	5^{0}	5^{0}	6^{5}	a	3^{5}	4^{2}
B	3^{2}	4^{0}	4^{3}	5^{3}	b	3^{5}	4^{2}
C	3^{2}	4^{0}	4^{3}	5^{3}	c	3^{5}	4^{1}
D	3^{2}	4^{0}	4^{3}	5^{3}	d	3^{5}	4^{2}
E	3^{0}	3^{5}	4^{0}	4^{7}	e	3^{5}	4^{2}
F	3^{0}	3^{5}	4^{0}	4^{7}	f	2^{3}	2^{6}
G	3^{2}	4^{0}	4^{3}	5^{3}	g	3^{5}	4^{2}
H	3^{2}	4^{0}	4^{3}	5^{3}	h	3^{5}	4^{2}
I	0^{7}	0^{7}	1^{1}	1^{2}	i	1^{1}	1^{1}
J	3^{0}	3^{6}	4^{0}	5^{0}	j	2^{0}	2^{2}
K	3^{2}	4^{1}	4^{3}	5^{4}	k	3^{5}	4^{2}
L	3^{0}	3^{5}	4^{0}	4^{7}	l	1^{1}	1^{1}
M	3^{7}	4^{5}	5^{1}	6^{1}	m	6^{0}	7^{0}
N	3^{2}	4^{0}	4^{3}	5^{3}	n	3^{5}	4^{2}
O	3^{4}	4^{2}	4^{5}	5^{5}	o	3^{6}	4^{3}
P	3^{2}	4^{0}	4^{3}	5^{3}	p	3^{5}	4^{2}
Q	3^{4}	4^{2}	4^{5}	5^{5}	q	3^{5}	4^{2}
R	3^{2}	4^{0}	4^{3}	5^{3}	r	2^{6}	3^{2}
S	3^{2}	4^{0}	4^{3}	5^{3}	s	3^{6}	4^{2}
T	3^{0}	3^{5}	4^{0}	4^{7}	t	2^{7}	3^{2}
U	3^{2}	4^{0}	4^{3}	5^{3}	u	3^{5}	4^{2}
V	3^{5}	4^{4}	4^{7}	6^{0}	v	4^{2}	4^{7}
W	4^{4}	5^{2}	6^{0}	7^{0}	w	5^{5}	6^{4}
X	3^{4}	4^{0}	4^{5}	5^{3}	x	4^{4}	5^{1}
Y	3^{6}	5^{0}	5^{0}	6^{6}	y	4^{6}	5^{3}
Z	3^{2}	4^{0}	4^{3}	5^{3}	z	3^{6}	4^{3}

NUMBER	6 INCH SERIES C	6 INCH SERIES D	8 INCH SERIES C	8 INCH SERIES D
1	1^{2}	1^{4}	1^{5}	2^{0}
2	3^{2}	4^{0}	4^{3}	5^{3}
3	3^{2}	4^{0}	4^{3}	5^{3}
4	3^{5}	4^{3}	4^{7}	5^{7}
5	3^{2}	4^{0}	4^{3}	5^{3}
6	3^{2}	4^{0}	4^{3}	5^{3}
7	3^{2}	4^{0}	4^{3}	5^{3}
8	3^{2}	4^{0}	4^{3}	5^{3}
9	3^{2}	4^{0}	4^{3}	5^{3}
0	3^{4}	4^{2}	4^{5}	5^{5}

GENERAL NOTES

1. WHERE MAST ARM MOUNTED STREET NAME SIGNS ARE SPECIFIED, THE MAST ARM ASSEMBLY AND POLES SHALL BE DESIGNED TO SUPPORT THE LOADINGS CALLED FOR ON STANDARDS 834001, 834006 AND 834011, AS APPLICABLE, PLUS TWO (2) SIGN PANELS 2′-6″ x 6′-0″ MOUNTED AS SHOWN. THE DESIGN SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CURRENT "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS" AS PUBLISHED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS FOR 80 M.P.H. WIND VELOCITY.
2. ALL SIGNS SHALL HAVE A WHITE REFLECTORIZED LEGEND AND BORDER ON A GREEN REFLECTORIZED BACKGROUND, TYPE AZ SHEETING, 3M DIAMOND GRADE SHEETING.
3. THE SIGN LENGTH SHOULD BE INCREASED IN 6-INCH INCREMENTS, BUT THE OVERALL LENGTH SHOULD NOT EXCEED 6′-0″.
4. ALL BORDERS SHALL BE 3/4 ″ WIDE AND CORNER RADIUS SHALL BE 2-1/4 ″.
5. SIGNFIX ALUMINUM CHANNEL FRAMING SYSTEM SHALL BE USED FOR ALL SIGNS ATTACHED TO SIGNAL POLES AND POSTS. LOCAL SUPPLIERS OF THE SIGNFIX ALUMINUM CHANNEL FRAMING SYSTEM ARE:

- * A.K.T. CORPORATION, SCHAUMBURG, IL
- * TUCKER COMPANY, INC., WAUWATOSA, WI
- * AMERICAN FABRICATION CO., CHICAGO HEIGHTS, IL
- * WESTERN TRAFFIC CONTROL INC., CICERO, IL

PARTS LISTING:

SIGN CHANNEL	PART #HPN053 (MED. CHANNEL)
SIGN SCREWS	1/4 ″ x 14 x 1″ H.W.H. #3 SELF TAPPING WITH NEOPRENE WASHER
BRACKETS	PART #HPN034 (UNIVERSAL) CHANNEL CLAMPS WITH STAINLESS STEEL STRAPPING

OTHER BRANDS OF MOUNTING HARDWARE ARE ACCEPTABLE, BASED UPON THE DEPARTMENT'S APPROVAL AND COMPATIBILITY WITH THE CHANNEL/BRACKET OF THE ABOVE PRODUCT.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		McHENRY	17	17

STA. TO STA.
ILLINOIS

REVISIONS	
NAME	DATE
D.A.Z./D.A.G.	11/90
	6/98
CADD	10/00

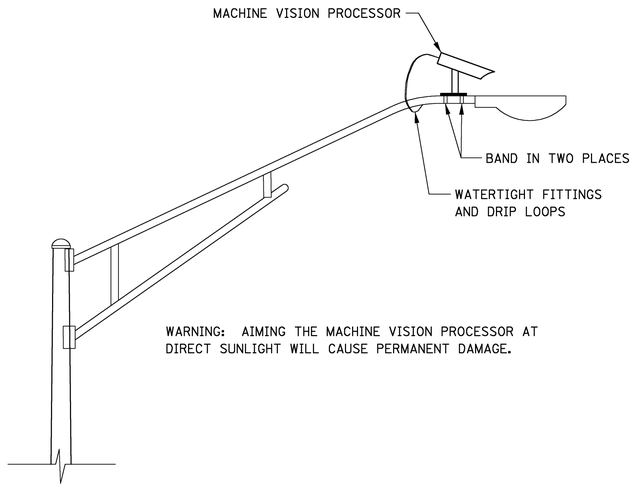
ILLINOIS DEPARTMENT OF TRANSPORTATION
MAST ARM MOUNTED STREET NAME SIGNS

SCALE: VERT. HORIZ. NONE
DATE 1-01-02
DRAWN BY: RDB
DESIGNED BY: JHE
CHECKED BY: DAD

TRAFFIC SIGNAL MODERNIZATION PLANS
RANDALL ROAD AT HARNISH DRIVE
VILLAGE OF ALGONQUIN, ILLINOIS

PROJ. # 3254.905
DATE: 1-25-08

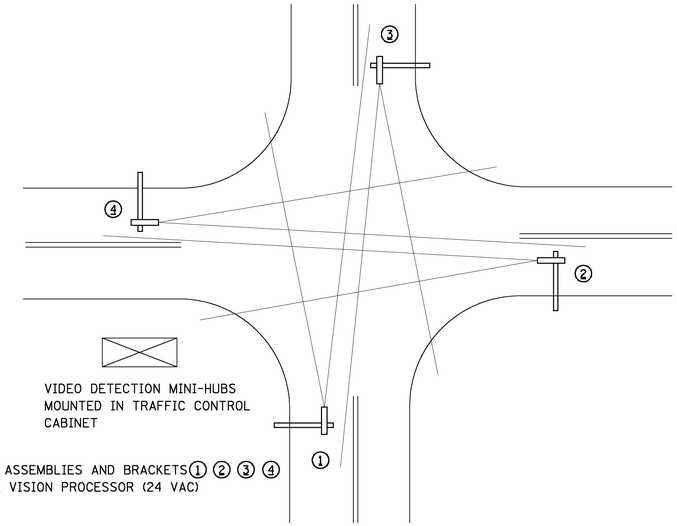
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	02-00265-00-WR	McHENRY	38	36
STA.		TO STA.		
	ILLINOIS			



WARNING: AIMING THE MACHINE VISION PROCESSOR AT DIRECT SUNLIGHT WILL CAUSE PERMANENT DAMAGE.

MACHINE VISION PROCESSOR MOUNTING DETAIL

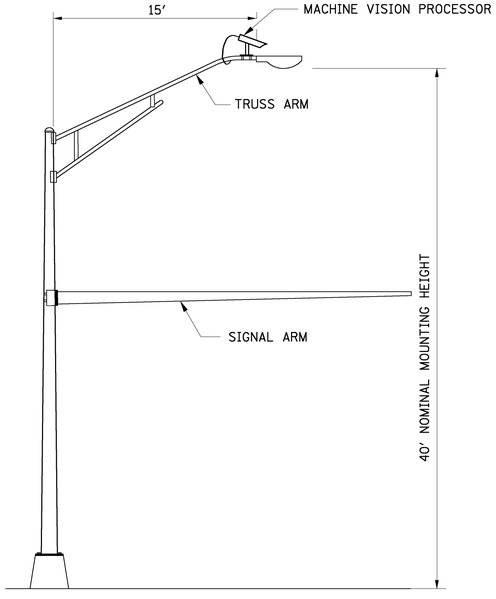
(NOT TO SCALE)



(4) MACHINE VISION PROCESSOR ASSEMBLIES AND BRACKETS ① ② ③ ④
POWER CABLE TO EACH MACHINE VISION PROCESSOR (24 VAC)

TYPICAL VIDEO VEHICLE DETECTION SYSTEM

(NOT TO SCALE)



COMBINATION MAST ARM ASSEMBLY AND POLE DIMENSIONS

(NOT TO SCALE)

REVISIONS	
NAME	DATE

CHRISTOPHER B. BURKE ENGINEERING LTD.
9575 West Higgins Road, Suite 600
Rosemont, Illinois 60018
(847) 823-0500

McHENRY COUNTY
DIVISION OF TRANSPORTATION

VIDEO DETECTION DETAILS

CHAPEL HILL ROAD AND BAY ROAD
McHENRY COUNTY

SCALE: N.T.S.
DATE: 11-14-2005

DRAWN BY: FPB
DESIGNED BY: ABR
CHECKED BY: KRC

N:\MCHENRYCO\01-563\DESIGN\DET_vdo-01563.dgn

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	-	McHENRY	38	32
STA.		TO STA.		
FED. ROAD DIST. NO. 1	ILLINOIS	FED. AID PROJECT		

LOOP DETECTOR NOTES

1. EACH PAIR OF LOOP WIRES SHALL BE PLACED IN A SEPARATE UNIT DUCT FROM THE EDGE OF PAVEMENT TO THE HANDHOLE. SPACING BETWEEN THE HOLES DRILLED IN THE PAVEMENT SHALL NOT BE LESS THAN 6" (150 mm). UNIT DUCT SHALL BE INCLUDED IN THE COST OF THE LOOP WIRE.

2. THE NUMBER OF LOOP TURNS SHALL BE AS RECOMMENDED BY THE AMPLIFIER MANUFACTURER. ALL ADJACENT SIDES OF THE LOOPS SHALL BE INSTALLED IN SUCH A WAY THAT THE CURRENT FLOW IS IN THE SAME DIRECTION TO REINFORCE ITS MAGNETIC FIELDS FOR SMALL VEHICLE DETECTION.

3. EACH LOOP LEAD-IN SHALL BE IDENTIFIED AND PERMANENTLY TAGGED IN THE HANDHOLE. EACH LEAD-IN CABLE TAG SHALL INDICATE THE LOCATION OF THE LOOP, LOOP ROTATION (CLOCKWISE/COUNTERCLOCKWISE), LOOP LEAD-IN DIRECTION (IN OR OUT), LOOP CABLE NUMBER AND LOCATION IN CABINET, AND NUMBER OF TURNS IN THE DETECTOR LOOPS IN WATER PROOF INK AS INDICATED ON THE DISTRICT 1 STANDARD TRAFFIC SIGNAL DESIGN DETAIL. THE CONTRACTOR SHALL MARK LOOP LOCATIONS ON RECORD DRAWINGS AND PRESENT TO THE ENGINEER AFTER FINAL INSPECTION. LOOPS SHALL BE MARKED BY LANE AND LOOP NUMBER. SEE DETAIL BELOW.

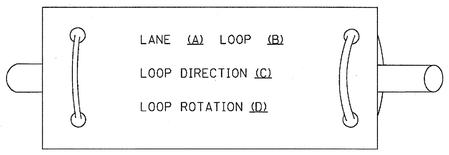
4. ALL LOOP CABLE SHALL BE FASTENED WITH PLASTIC TIE WRAP TO THE HANDHOLE HOOKS.

5. IN ASPHALT PAVEMENT, LOOPS SHOULD BE PLACED IN THE BINDER AND DIVEHOLES MARKED AT THE CURB WITH A SAW-CUT. THE SAW-CUT SHALL BE CUT IN ACCORDANCE WITH LOCAL AND E.P.A. DUST CONTROL REQUIREMENTS. DETECTOR LOOP(S) SHALL NOT BE INSTALLED IN WET CONDITIONS AND THE SAW-CUTS MUST BE FREE OF DEBRIS AND RESIDUE SUCH AS DUST AND WATER WHICH IS TO BE ACHIEVED BY THE USE OF COMPRESSED AIR, WIRE BRUSHING AND HEAT DRYING ACCORDING TO SEALANT MANUFACTURER REQUIREMENTS. THE DETECTOR WIRE SHALL BE HELD IN PLACE BY THE USE OF FORM WEDGES. WEDGES SHALL BE SPACED NO MORE THAN 18" (450 mm) APART.

6. LOOP SPLICES SHALL BE SOLDERED USING A SOLDERING IRON. BLOW TORCHES OR OTHER DEVICES WHICH OXIDIZE COPPER CABLE SHALL NOT BE ALLOWED FOR SOLDERING OPERATIONS. SEE DETAIL BELOW RIGHT.

7. PREFORMED DETECTOR LOOPS SHALL BE USED, AS SHOWN ON THE PLANS, WHERE NEW CONCRETE PAVEMENT IS PROPOSED. THE INSTALLATION OF PREFORMED LOOPS SHALL BE IN ACCORDANCE WITH THE DISTRICT 1 SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER.

LOOP LEAD-IN CABLE TAG

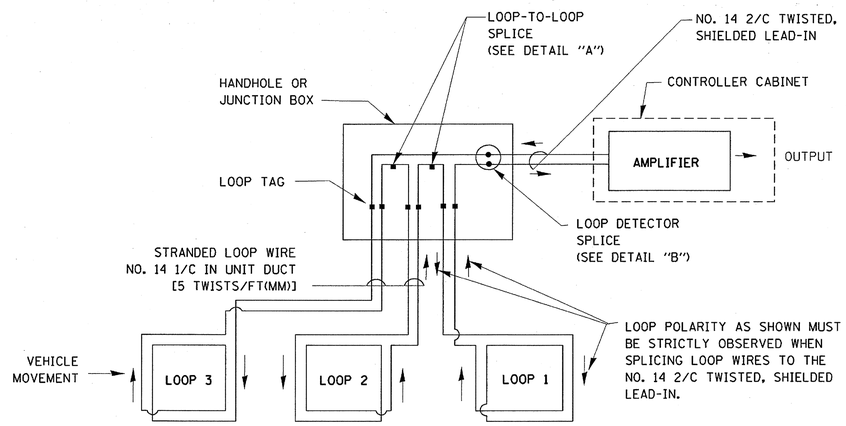


A. LANE 1 IS THE LANE CLOSEST TO THE CENTERLINE OF THE ROADWAY

B. LOOP #1 IS THE LOOP IN THE LANE CLOSEST TO THE INTERSECTION.

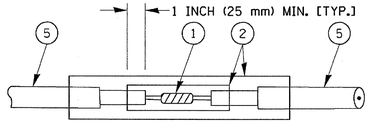
C. LABEL LOOP CABLE "IN" OR LOOP CABLE "OUT".

D. LABEL LOOP CABLE CLOCKWISE OR LOOP CABLE COUNTERCLOCKWISE.

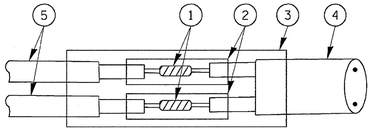


DETECTOR LOOP WIRING SCHEMATIC

- LOOPS SHALL BE SPLICED IN SERIES.
- SAW-CUTS SHALL BE A MINIMUM WIDTH OF 5/16" (8 mm).
- SAW-CUT DEPTHS SHALL BE 3" (75 mm). IF IN CONCRETE, THE SAW-CUT DEPTH SHALL BE TO THE TOP OF THE REINFORCEMENT.
- LOOP CORNERS SHALL BE DRILLED WITH A 2" (50 mm) DIAMETER CORE.



DETAIL "A"
LOOP-TO-LOOP SPLICE



DETAIL "B"
LOOP-TO-CONTROLLER SPLICE

LOOP DETECTOR SPLICE

(1) WESTERN UNION SPLICE SOLDERED WITH ROSIN CORE FLUX. ALL EXPOSED SURFACES OF THE SOLDER SHALL BE SMOOTH.

(2) WCSMW 30/100 HEAT SHRINK TUBE, MINIMUM LENGTH 3" (75 mm), UNDERWATER GRADE.

(3) WCS 200/750 HEAT SHRINK TUBE, MINIMUM LENGHT 6" (150 mm), UNDERWATER GRADE.

(4) NO. 14 2/C TWISTED, SHIELDED CABLE.

(5) LOOP CONDUCTOR WITH FLEXIBLE PLASTIC TUBE.

REVISIONS	
NAME	DATE

ILLINOIS DEPARTMENT OF TRANSPORTATION

DISTRICT ONE
STANDARD TRAFFIC SIGNAL
DESIGN DETAILS

SCALE: VERT. NONE
HORIZ.
DATE 1-01-02

DRAWN BY: RWP
DESIGNED BY: DAD
CHECKED BY: DAZ
SHEET 1 OF 4

$FILE$
Thu Feb 21 08:41:30 2002
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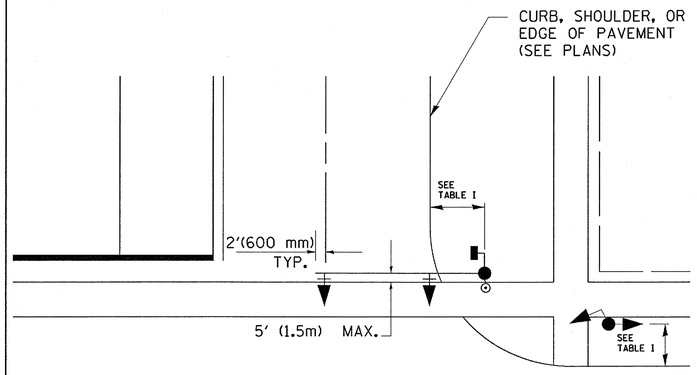
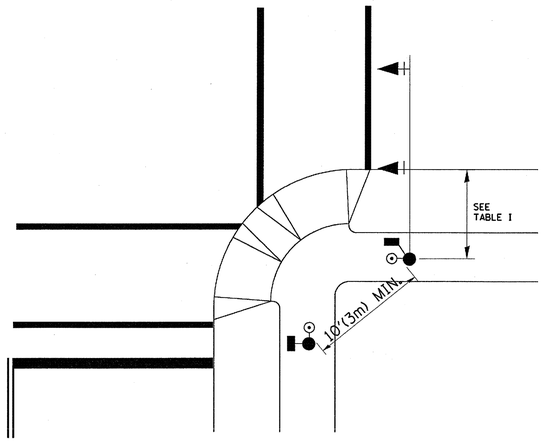
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		McHENRY	38	33
STA.		TO STA.		
FED. ROAD DIST. NO. 1	ILLINOIS	FED. AID PROJECT		

TRAFFIC SIGNAL MAST ARM AND POST

MAST ARM MOUNTED SIGNAL IN PROPOSED & FUTURE SIDEWALK AREA. INTERSECTION SHOWN WITH PEDESTRIAN SIGNAL AND PUSHBUTTON DETECTOR



PEDESTRIAN SIGNAL PUSHBUTTON



RECOMMENDED PUSHBUTTON LOCATIONS FOR ACCESSIBLE PEDESTRIAN SIGNALS SHALL BE IN ACCORDANCE WITH THE CURRENT MUTCD (SEE NOTE 1). TO MEET MUTCD REQUIREMENTS, PEDESTRIAN SIGNAL PUSHBUTTONS MAY HAVE TO BE MOUNTED ON A SEPARATE POST.

NOTES:

1. AT ACCESSIBLE PEDESTRIAN SIGNAL LOCATIONS WITH PEDESTRIAN ACTUATION. EACH PUSHBUTTON SHALL ACTIVATE BOTH THE WALK INTERVAL AND THE ACCESSIBLE PEDESTRIAN SIGNALS.

   AT ACCESSIBLE PEDESTRIAN SIGNAL LOCATIONS, PUSHBUTTONS SHOULD CLEARLY INDICATE WHICH CROSSWALK SIGNAL IS ACTUATED BY EACH PUSHBUTTON. PUSHBUTTONS AND TACTILE ARROWS SHOULD HAVE HIGH VISUAL CONTRAST (SEE THE DEPARTMENT OF JUSTICE'S AMERICANS WITH DISABILITIES ACT STANDARDS FOR ACCESSIBLE DESIGN, 1991). TACTILE ARROWS SHOULD POINT IN THE SAME DIRECTION AS THE ASSOCIATED CROSSWALK. AT CORNERS OF SIGNALIZED LOCATIONS WITH ACCESSIBLE PEDESTRIAN SIGNALS WHERE PEDESTRIAN PUSHBUTTONS ARE PROVIDED, THE PUSHBUTTONS SHOULD BE SEPARATED BY THE DISTANCE OF AT LEAST 10 FT (3m). THIS ENABLES PEDESTRIANS WHO HAVE VISUAL DISABILITIES TO DISTINGUISH AND LOCATE THE APPROPRIATE PUSHBUTTON.

   PUSHBUTTONS FOR ACCESSIBLE PEDESTRIAN SIGNALS SHOULD BE LOCATED AS FOLLOWS:

   A: ADJACENT TO A LEVEL ALL-WEATHER SURFACE TO PROVIDE ACCESS FROM A WHEELCHAIR, AND WHERE THERE IS AN ALL WEATHER SURFACE, WHEELCHAIR ACCESSIBLE ROUTE TO THE RAMP.

   B: WITHIN 5 FT (1.5m) OF THE CROSSWALK EXTENDED.

   C: WITHIN 10 FT (3m) OF THE EDGE OF CURB, SHOULDER, OR PAVEMENT.

   D: PARALLEL TO THE CROSSWALK TO BE USED (SEE MUTCD FIGURE 4E-2).

   E: NORMAL PEDESTRIAN PUSHBUTTON MOUNTING HEIGHT SHOULD BE 3.5 FT (1.05m) ABOVE ADJACENT SIDEWALK

2. PEDESTRIAN SIGNAL FACES SHALL BE MOUNTED WITH THE BOTTOM OF THE HOUSING NOT LESS THAN 8 FT (2.4m) NOR MORE THAN 10 FT (3.0m) ABOVE THE SIDEWALK LEVEL AND SO THERE IS A PEDESTRIAN INDICATION IN THE LINE OF PEDESTRIANS' VISION WHICH PERTAINS TO THE CROSSWALK BEING USED.

3. THE BOTTOM OF THE HOUSING OF A VEHICLE SIGNAL FACE, NOT MOUNTED OVER A ROADWAY, SHALL BE AT LEAST 10 FT (3.0m) BUT NOT MORE THAN 15 FT (4.5m) ABOVE THE SIDEWALK OR, ABOVE THE PAVEMENT GRADE AT THE CENTER OF THE HIGHWAY IF NO SIDEWALKS EXIST.

4. THE BOTTOM OF THE HOUSING OF A VEHICLE SIGNAL FACE, MOUNTED OVER A ROADWAY, SHALL BE ACCORDING TO CURRENT STATE STANDARDS 877001 AND 877006. (16 FT (5m) MIN., 18 FT (5.5m) MAX., FROM HIGHEST POINT OF PAVEMENT)

PEDESTRIAN SIGNAL POST

PEDESTRIAN SIGNAL HEAD AND PEDESTRIAN PUSHBUTTON DETECTOR LOCATION

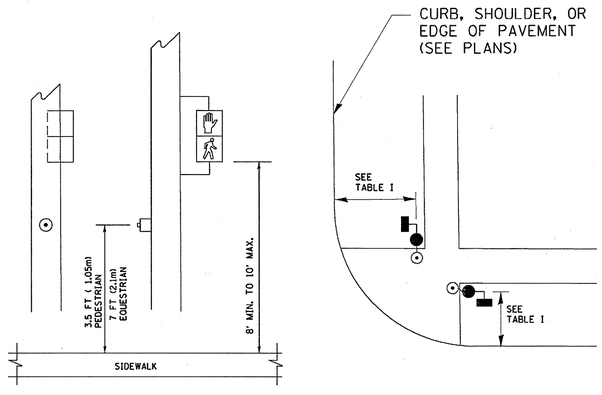


TABLE I

TRAFFIC SIGNAL EQUIPMENT	COMBINATION CONCRETE CURB AND GUTTER (MIN. DIST. FROM BACK OF CURB)	SHOULDER/NON-CURBED AREA (MIN. DIST. FROM EDGE OF PAVEMENT)
TRAFFIC SIGNAL MAST ARM POLE	6 FT (1.8m)	SHOULDER WIDTH + 2FT(0.6m), MINIMUM 10FT(3.0m)
TRAFFIC SIGNAL POST	4 FT (1.2m)	SHOULDER WIDTH + 2FT(0.6m), MINIMUM 10FT(3.0m)
PEDESTRIAN SIGNAL POST	4 FT (1.2m)	SHOULDER WIDTH + 2FT(0.6m), MINIMUM 10FT(3.0m)
PEDESTRIAN PUSHBUTTON	SEE NOTE 1	SEE NOTE 1

REVISIONS	
NAME	DATE

ILLINOIS DEPARTMENT OF TRANSPORTATION

DISTRICT 1

STANDARD TRAFFIC SIGNAL DESIGN DETAILS

SCALE: VERT. NONE HORIZ.

DATE 1-01-02

DRAWN BY: RWP
DESIGNED BY: DAD
CHECKED BY: DAZ
SHEET 2 OF 4

TS05

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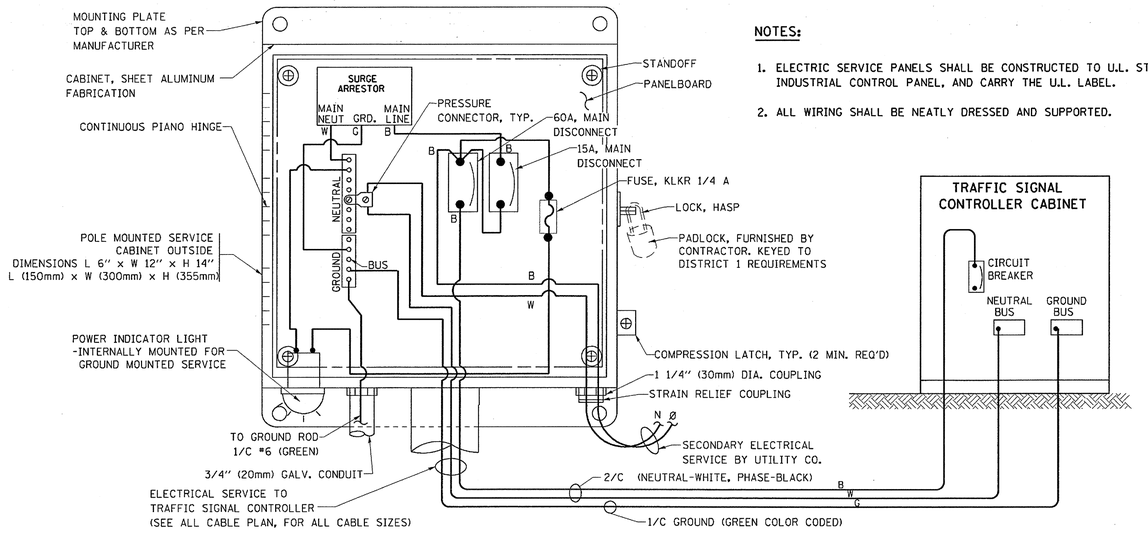
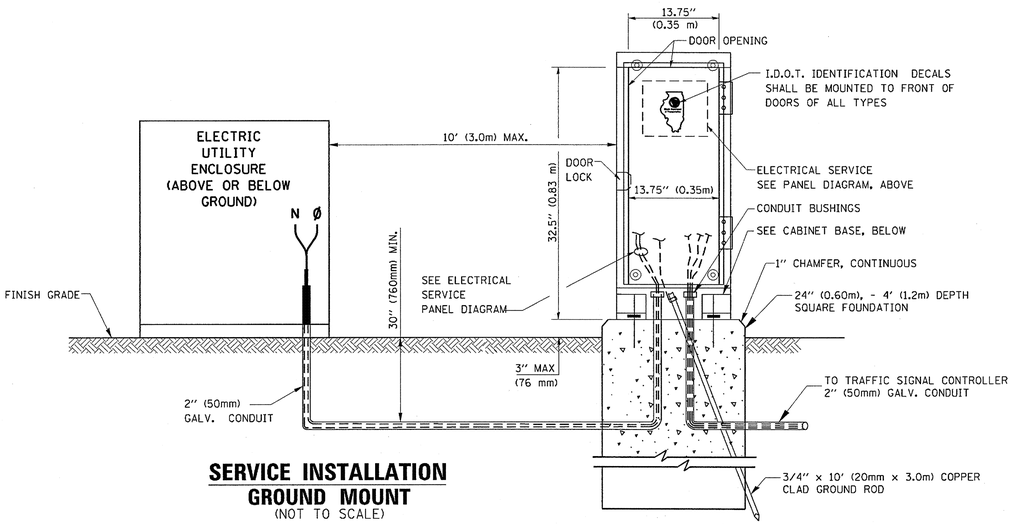
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		McHENRY	38	34
STA.		TO STA.		
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		



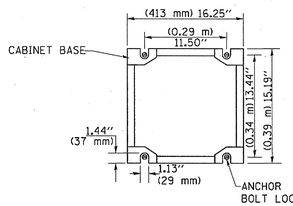
ELECTRICAL SERVICE – PANEL DIAGRAM (TYPICAL FOR POLE AND GROUND MOUNTED SERVICE)

NOTES:

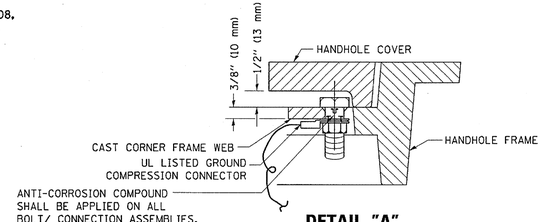
1. ELECTRIC SERVICE PANELS SHALL BE CONSTRUCTED TO U.L. STD 508, INDUSTRIAL CONTROL PANEL, AND CARRY THE U.L. LABEL.
2. ALL WIRING SHALL BE NEATLY DRESSED AND SUPPORTED.



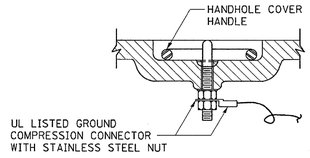
SERVICE INSTALLATION GROUND MOUNT
(NOT TO SCALE)



CABINET – BASE BOLT PATTERN
(NOT TO SCALE)



DETAIL "A"



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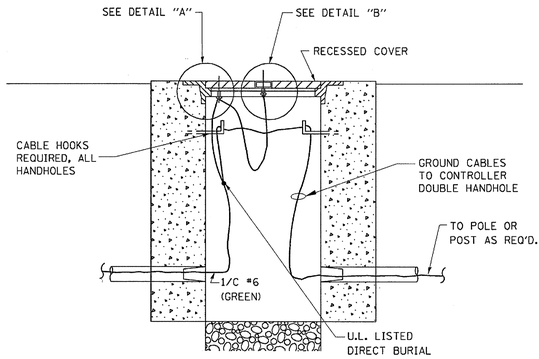
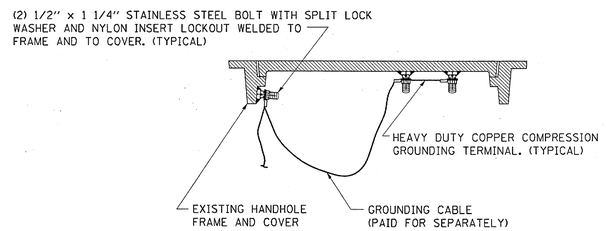


HANDHOLE COVER & FRAME – GROUNDING DETAIL
(NOT TO SCALE)

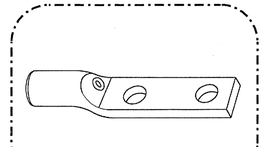


EXISTING HANDHOLE COVER & FRAME – GROUNDING DETAIL
(NOT TO SCALE)

NOTES:

GROUNDING SYSTEM

1. THE GROUNDING SYSTEM SHALL CONSIST OF AN INSULATED CONDUCTOR TYPE XLP, NO. 6 A.W.G., STRANDED COPPER TO BE INSTALLED IN RACEWAYS. THE GROUNDING CABLE SHALL BE INSTALLED IN A CONTINUOUS MANNER AS SHOWN ON THE CABLE PLAN PROVIDED. ALL GROUNDING CONDUCTORS SHALL BE BONDED TO METAL ENCLOSURE (HANDHOLE, POST, MAST ARM, CONTROLLER, ETC,). GROUND ROD SHALL BE 3/4" DIA. x 10'-0" (20mm x 3.0m) LONG, COPPER CLAD. ONE GROUND ROD SHALL BE INSTALLED AT ALL POST FOUNDATIONS, POLE FOUNDATIONS, CONTROLLER CABINET FOUNDATION AND ELECTRICAL SERVICE INSTALLATION AS INDICATED ON THE CABLE PLAN. IF THERE ARE ANY SPECIAL CONDITIONS SUCH AS SUB-SURFACE CONDITIONS OR INSTALLATION PROBLEMS, THE RESIDENT ENGINEER SHALL BE NOTIFIED OR CONTACT THE BUREAU OF TRAFFIC, ILLINOIS DEPARTMENT OF TRANSPORTATION DISTRICT ONE AT (847) 705-4139.
2. THE NEUTRAL CONDUCTOR AND THE GROUND CONDUCTOR SHALL BE CONNECTED IN THE SERVICE INSTALLATION. AT NO OTHER POINT IN THE TRAFFIC SIGNAL SYSTEM SHALL THE NEUTRAL AND GROUND CONDUCTORS BE CONNECTED.
3. ALL EQUIPMENT GROUNDING CONDUCTORS SHALL TERMINATE AT THE GROUND BUS IN THE CONTROLLER CABINET.
4. THE CONTRACTOR SHALL PROVIDE A GROUND CABLE WITH CONNECTORS BETWEEN THE HANDHOLE COVER AND HANDHOLE FRAME.

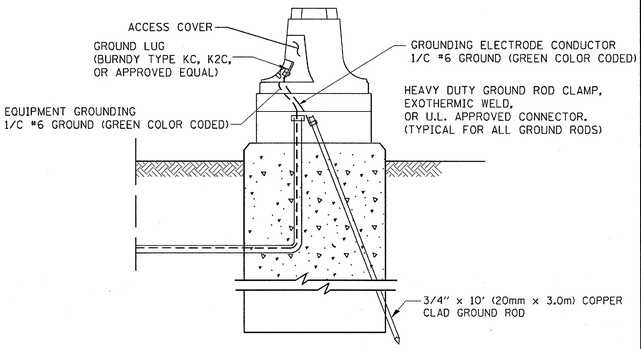


HEAVY-DUTY COMPRESSION TERMINAL (BURNDY TYPE YGHA OR APPROVED EQUAL)

3/4" (20mm) HEAVY-DUTY GROUND ROD CLAMP (BURNDY TYPE GRC OR APPROVED EUAL)

NOTES:

- ALL CLAMPS SHALL BE BRONZE OR COPPER, UL APPROVED.
- GROUND CABLE SHALL BE LOOPED OVER HOOKS IN THE HANDHOLES
  6.5' (2.0m) SLACK SHALL BE PROVIDED IN SINGLE HANDHOLES
  13' (4.0m) OF SLACK SHALL BE PROVIDED IN DOUBLE HANDHOLES.
  5' (1.4m) OF SLACK SHALL BE PROVIDED BETWEEN FRAME AND COVER.



MAST ARM POLE / POST–GROUNDING DETAIL
(NOT TO SCALE)

REVISIONS NAME	DATE

ILLINOIS DEPARTMENT OF TRANSPORTATION

DISTRICT 1

STANDARD TRAFFIC SIGNAL DESIGN DETAILS

SCALE: VERT. NONE HORIZ.
DATE 1-01-02

DRAWN BY: RWP
DESIGNED BY: DAD
CHECKED BY: DAZ
SHEET 3 OF 4

TS05

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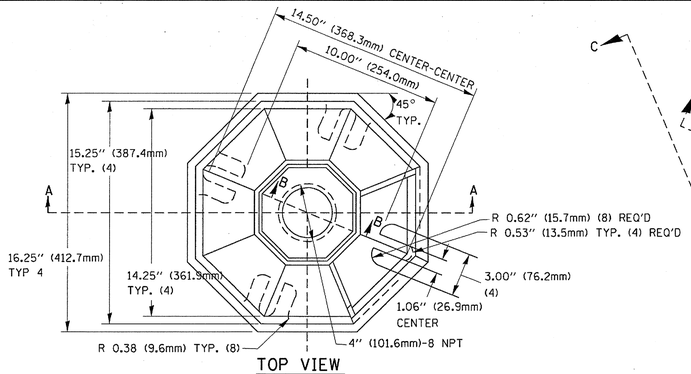
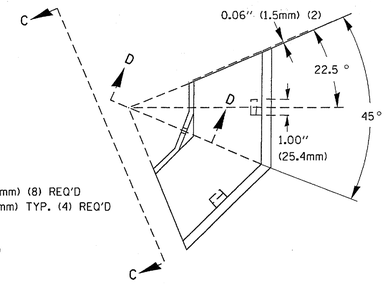
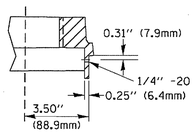
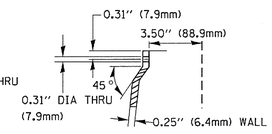


TOP VIEW

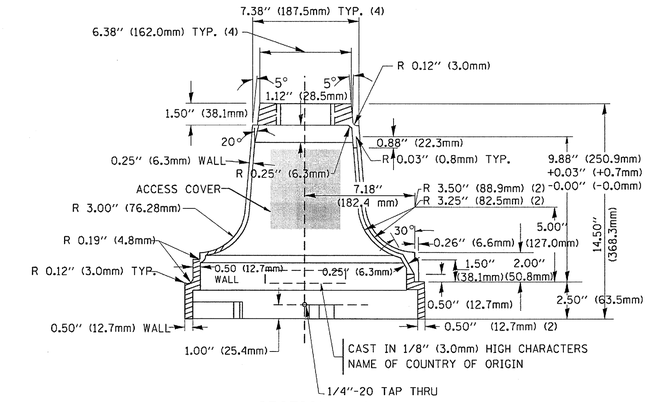




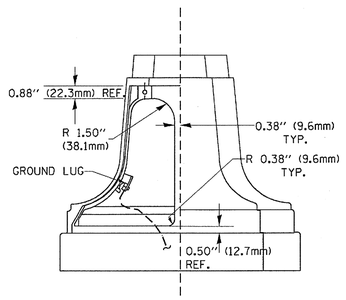
SECTION B-B



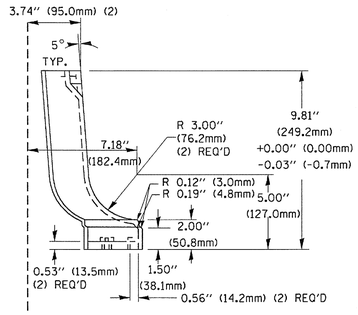
SECTION D-D



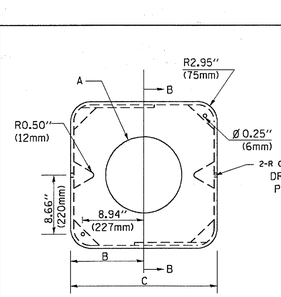
SECTION A-A

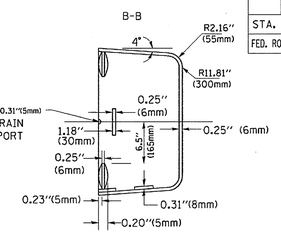


VIEW C-C



TRAFFIC SIGNAL POST - MOUNTING BASE - TYPE A





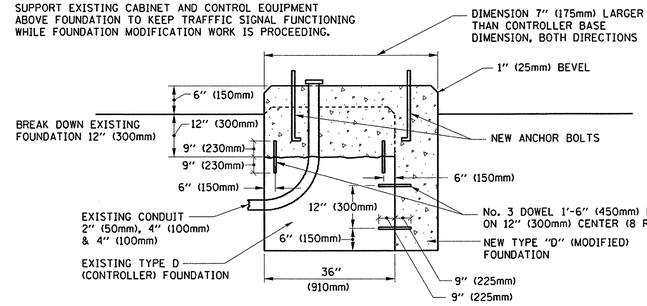
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		McHENRY	38	35
STA.		TO STA.		
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		

MATERIAL:
- ASTM A48 CLASS 30 GREY IRON
- ASTM A123 HOT DIPPED GALVANIZED

TYPE	A	B	C	HEIGHT	WEIGHT
I	Ø 10.125"(257mm)	9.5"(241mm)	19"(483mm)	12" (300mm)	24kg
II	Ø 11.125"(283mm)	10.75"(273mm)	21.5"(546mm)	12" (300mm)	26kg

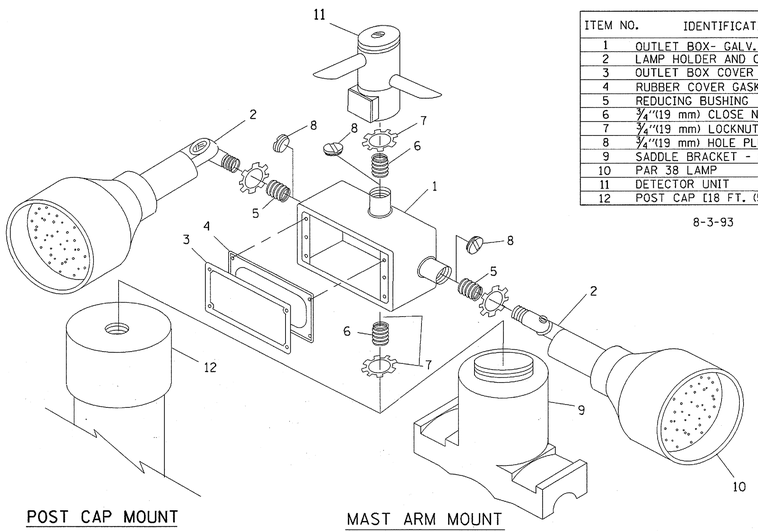
SHROUD DETAIL

NOTE:
SUPPORT EXISTING CABINET AND CONTROL EQUIPMENT ABOVE FOUNDATION TO KEEP TRAFFFIC SIGNAL FUNCTIONING WHILE FOUNDATION MODIFICATION WORK IS PROCEEDING.



MODIFY EXISTING TYPE "D" FOUNDATION

(NOT TO SCALE)



POST CAP MOUNT

MAST ARM MOUNT

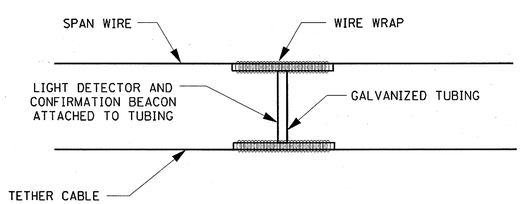
EMERGENCY VEHICLE DETECTOR WITH CONFIRMATION BEACON MOUNTING DETAIL

ITEM NO.	IDENTIFICATION
1	OUTLET BOX- GALV. 21 CU.IN. (0.000344 CU-M)
2	LAMP HOLDER AND COVER
3	OUTLET BOX COVER
4	RUBBER COVER GASKET
5	REDUCING BUSHING
6	¾"(19 mm) CLOSE NIPPLE
7	¾"(19 mm) LOCKNUT
8	¾"(19 mm) HOLE PLUG
9	SADDLE BRACKET - GALV.
10	PAR 38 LAMP
11	DETECTOR UNIT
12	POST CAP (18 FT. (5.4 m) POST MIN.)

8-3-93

NOTES:

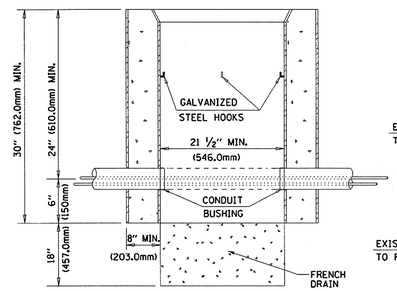
1. ALL ELECTRICAL ITEMS, EXCEPT ITEMS #2 AND #11 SHALL BE ALUMINUM OR GALVANIZED
2. ITEM #1- OZ/GEDNEY FSX-1-50 OR EQUIVALENT
   ITEM #2- MULBERRY CON-O-SHADE LAMP SHIELD OR EQUIVALENT
   ITEM #9- "BAND-IT" SADDLE BRACKET OR EQUIVALENT
3. WHEN POST MOUNTING IS SPECIFIED, ITEM #9 SHALL NOT BE REQUIRED. THE DETECTION UNIT SHALL BE MOUNTED DIRECTLY ON TOP OF THE CAP BY DRILLING AND TAPPING A ¾"(19 mm) HOLE WITH PIPE THREADS. THE POST CAP SHALL EITHER BE SCREWED TO THE TOP OF THE POST OR A MINIMUM OF 3 TIGHTENING SCREWS SHALL BE REQUIRED ON EACH CAP.



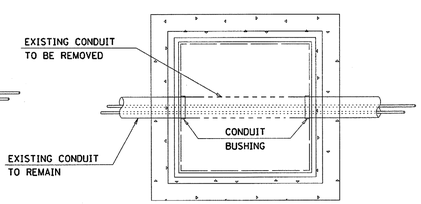
LIGHT DETECTOR AND CONFIRMATION BEACON MOUNTING FOR TEMPORARY TRAFFIC SIGNALS

(NOT TO SCALE)

NOTES:
1. REMOVAL OF EXISTING CONDUIT FROM THE HANDHOLE AND THE INSTALLATION OF THE CONDUIT BUSHING SHALL BE INCIDENTAL TO THE HANDHOLE.



ELEVATION



PLAN

DETAIL
HANDHOLE TO INTERCEPT EXISTING CONDUIT
N.T.S.

REVISIONS NAME	DATE

ILLINOIS DEPARTMENT OF TRANSPORTATION

DISTRICT 1
STANDARD TRAFFIC SIGNAL DESIGN DETAILS

SCALE: VERT. NONE HORIZ.
DATE 1-01-02

DRAWN BY: RWP
DESIGNED BY: DAD
CHECKED BY: DAZ
SHEET 4 OF 4

TS05

$FILE$
Thu Feb 21 08:41:31 2002
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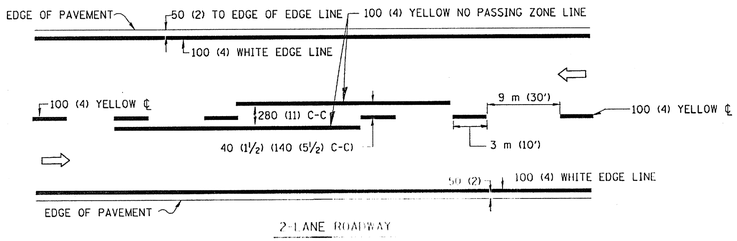
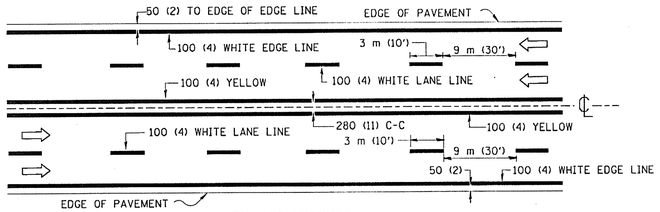
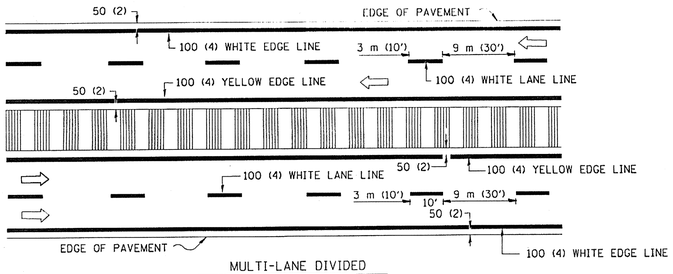


2-LANE ROADWAY



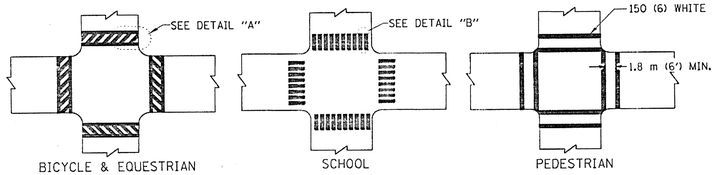
MULTI-LANE UNDIVIDED

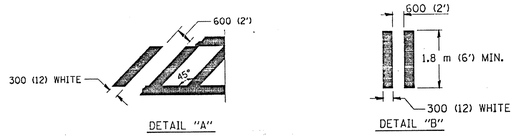


MULTI-LANE DIVIDED
WITH MOUNTABLE MEDIAN

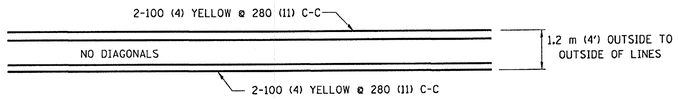
NOTE: MEDIANS WITH BARRIER CURB DO NOT REQUIRE AN EDGE LINE

TYPICAL LANE AND EDGE LINE MARKING

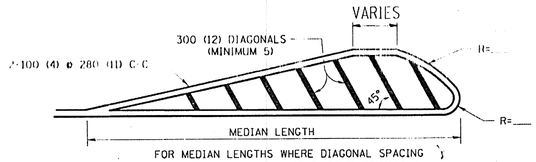




TYPICAL CROSSWALK MARKING



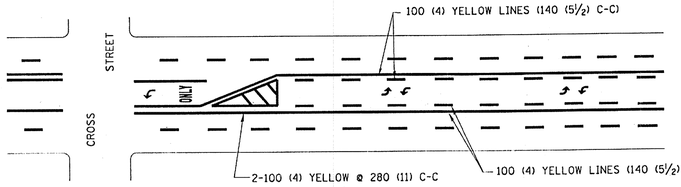
1.2 m (4') WIDE MEDIANS ONLY



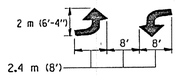
FOR MEDIAN LENGTHS WHERE DIAGONAL SPACING CANNOT BE ATTAINED, USE 5 (FIVE) EQUALLY SPACED DIAGONAL LINES.

DIAGONAL LINE SPACING: 15 m (50') C-C (LESS THAN 50 km/h (30 MPH))
25 m (75') C-C (50 km/h (30 MPH) TO 70 km/h (45 MPH))
45 m (150') C-C (MORE THAN 70 km/h (45 MPH))

MEDIANS OVER 1.2 m (4') WIDE

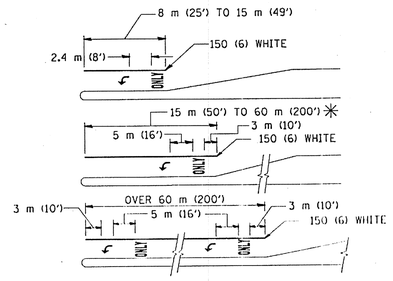


A MINIMUM OF TWO PAIRS OF TURN ARROWS SHALL BE USED, WHITE IN COLOR. ADDITIONAL PAIRS SHALL BE PLACED AT 60 m (200') TO 90 m (300') INTERVALS.



MEDIAN WITH TWO-WAY LEFT TURN LANE

TYPICAL PAINTED MEDIAN MARKING

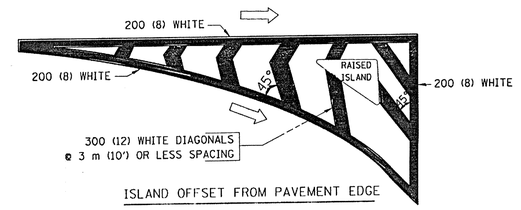


FULL SIZE LETTERS 2.4 m (8') AND ARROWS SHALL BE USED.
↰ AREA = 1.5 m² (15.6 SQ. FT.) ONLY AREA = 1.9 m² (20.8 SQ. FT.)

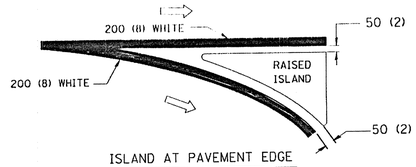
✳ TURN LANES IN EXCESS OF 120 m (400') IN LENGTH MAY HAVE AN ADDITIONAL SET OF ARROW - "ONLY" INSTALLED MIDWAY BETWEEN THE OTHER TWO SETS OF ARROW - "ONLY".

TYPICAL LEFT (OR RIGHT) TURN LANE

TYPICAL TURN LANE MARKING



ISLAND OFFSET FROM PAVEMENT EDGE



ISLAND AT PAVEMENT EDGE

TYPICAL ISLAND MARKING

TYPE OF MARKING	WIDTH OF LINE	PATTERN	COLOR	SPACING / REMARKS
CENTERLINE ON 2 LANE PAVEMENT	100 (4)	SKIP-DASH	YELLOW	3 m (10') LINE WITH 9 m (30') SPACE
CENTERLINE ON MULTI-LANE UNDIVEDED PAVEMENT	2 ⊠ 100 (4)	SOLID	YELLOW	280 (11) C-C
NO PASSING ZONE LINES: FOR ONE DIRECTION FOR BOTH DIRECTIONS	100 (4) 2 ⊠ 100 (4)	SOLID SOLID	YELLOW YELLOW	140 (5½) C-C FROM SKIP-DASH CENTERLINE 280 (11) C-C OMIT SKIP-DASH CENTERLINE BETWEEN
LANE LINES	100 (4) 125 (5) ON FREEWAYS	SKIP-DASH SKIP-DASH	WHITE WHITE	3 m (10') LINE WITH 9 m (30') SPACE
DOTTED LINES (EXTENSIONS OF CENTER, LANE OR TURN LANE MARKINGS)	SAME AS LINE BEING EXTENDED	SKIP-DASH	SAME AS LINE BEING EXTENDED	600 (2') LINE WITH 1.8 m (6') SPACE
EDGE LINES	100 (4)	SOLID	YELLOW-LEFT WHITE-RIGHT	OUTLINE MOUNTABLE MEDIANS IN YELLOW; EDGE LINES ARE NOT USED NEXT TO BARRIER CURB
TURN LANE MARKINGS	150 (6) LINE; FULL SIZE LETTERS & SYMBOLS (2.4 m (8'))	SOLID	WHITE	SEE TYPICAL TURN LANE MARKING DETAIL
TWO WAY LEFT TURN MARKING	2 ⊠ 100 (4) EACH DIRECTION 2.4 m (8') LEFT ARROW	SKIP-DASH AND SOLID IN PAIRS	YELLOW WHITE	3 m (10') LINE WITH 9 m (30') SPACE FOR SKIP-DASH; 140 (5½) C-C BETWEEN SOLID LINE AND SKIP-DASH LINE SEE TYPICAL TWO-WAY LEFT TURN MARKING DETAIL
CROSSWALK LINES (PEDESTRIAN) A. DIAGONALS (BIKE & EQUESTRIAN) B. LONGITUDINAL BARS (SCHOOL)	2 ⊠ 150 (6) 300 (12) ⊠ 45° 300 (12) ⊠ 90°	SOLID SOLID SOLID	WHITE WHITE WHITE	NOT LESS THAN 1.8 m (6') APART 600 (2') APART 600 (2') APART SEE TYPICAL CROSSWALK MARKING DETAILS.
STOP LINES	600 (24)	SOLID	WHITE	PLACE 1.2 m (4') IN ADVANCE OF AND PARALLEL TO CROSSWALK, IF PRESENT. OTHERWISE, PLACE AT DESIRED STOPPING POINT.
PAINTED MEDIANS	2 ⊠ 100 (4) WITH 300 (12) DIAGONALS ⊠ 45° NO DIAGONALS USED FOR 1.2 m (4') WIDE MEDIANS	SOLID	YELLOW: TWO WAY TRAFFIC WHITE: ONE WAY TRAFFIC	280 (11) C-C FOR THE DOUBLE LINE SEE TYPICAL PAINTED MEDIAN MARKING.
GORE MARKING AND CHANNELIZING LINES	200 (8) WITH 300 (12) DIAGONALS ⊠ 45°	SOLID	WHITE	DIAGONALS: 4.5 m (15') C-C (LESS THAN 50 km/h (30 MPH)) 6 m (20') C-C (50 km/h (30 MPH) TO 70 km/h (45 MPH)) 9 m (30') C-C (OVER 70 km/h (45 MPH))
RAILROAD CROSSING	600 (24) TRANSVERSE LINES; "RR" IS 1.8 m (6') LETTERS; 400 (16) LINE FOR "X"	SOLID	WHITE	SEE STATE STANDARD 780001 AREA OF: "R"=0.40 m² (4.3 SQ. FT.) EACH "X"=5.0 m² (54.0 SQ. FT.)
SHOULDER DIAGONALS	300 (12) ⊠ 45°	SOLID	WHITE - RIGHT YELLOW - LEFT	15 m (50') C-C (LESS THAN 50 km/h (30 MPH)) 25 m (75') C-C (50 km/h (30 MPH) TO 70 km/h (45 MPH)) 45 m (150') C-C (OVER 70 km/h (45 MPH))

FOR FURTHER DETAILS ON PAVEMENT MARKING REFER TO STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION ADOPTED JANUARY 1, 1997 AND STATE STANDARD 780001.

F. A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO
		McHENRY	38	28
STA.		TO STA.		
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		

All dimensions are in millimeters (inches) unless otherwise shown.

ILLINOIS DEPARTMENT OF TRANSPORTATION

DISTRICT ONE
TYPICAL PAVEMENT MARKINGS

SCALE: NONE
DRAWN BY CADD
DATE 04/15/97
CHECKED BY

REVISIONS	
NAME	DATE
EVERS	03-19-90
T. RAMMACHER	10-27-94
ALEX HOUSEH	10-09-96
ALEX HOUSEH	10-17-96

TC-13

Tue Apr 15 06:29:11 1997
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VI=TC13

APPENDIX D

MCDOT TRAFFIC SIGNAL SPECIFICATIONS

TRAFFIC SIGNAL SPECIFICATIONS

Effective: January 1, 2008
Revised: March 28, 2008

These Traffic Signal Special Provisions and the "District 1 Standard Traffic Signal Design Details" supplement the requirements of the State of Illinois "Standard Specifications for Road and Bridge Construction." The intent of these Special Provisions is to prescribe the materials and construction methods commonly used for traffic signal installations. All material furnished shall be new. The locations and the details of all installations shall be as indicated on the Plans or as directed by the Engineer. The work to be done under this contract consists of furnishing and installing all traffic signal work as specified in the Plans and as specified herein in a manner acceptable and approved by the Engineer.

SECTION 720 SIGNING

MAST ARM SIGN PANELS.

Add the following to Section 720.02 of the Standard Specifications:

Signs attached to poles or posts (such as mast arm signs) shall have mounting brackets and sign channels which are equal to and completely interchangeable with those used by the McHenry County Sign Shop. Signfix Aluminum Channel Framing System is currently recommended, but other brands of mounting hardware are acceptable based upon the Department's approval. All signs shall have a white reflectorized legend and border on a green reflectorized background, type AZ reflective sheeting. The sign face shall not have any holes. 3M Scotch Joining Systems bonding tape or approved equal shall be used in place of screws or rivets.

DIVISION 800 ELECTRICAL

INSPECTION OF ELECTRICAL SYSTEMS.

Add the following to Section 801.10 of the Standard Specifications:

All cabinets including temporary traffic signal cabinets shall be assembled by an approved equipment supplier in District One. The Department reserves the right to request any controller and cabinet to be tested at the equipment supplier facilities prior to field installation, at no extra cost to this contract. All railroad interconnected (including temporary railroad interconnect) controllers and cabinets shall be newly constructed, built, tested and approved by the controller equipment vendor, in the vendor's District One facility, prior to field installation. The vendor shall provide the technical equipment and assistance as required by the Engineer to fully test this equipment.

DAMAGE TO TRAFFIC SIGNAL SYSTEM.

Revise Section 801.12(b) of the Standard Specifications to read:

Any damaged equipment or equipment not operating properly from any cause whatsoever shall be repaired with new equipment provided by the Contractor at no additional cost to the Contract and or owner of the traffic signal system, all as approved by the Engineer. Final repairs or replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection otherwise the traffic signal installation will not be accepted. Cable splices outside the controller cabinet shall not be allowed.

RESTORATION OF WORK AREA.

Add to Section 801 of the Standard Specifications:

Restoration of the traffic signal work area shall be included in the related pay items such as foundation, conduit, handhole, trench and backfill, etc. All roadway surfaces such as shoulders, medians, sidewalks, pavement, etc. shall be replaced in kind. All damage to mowed lawns shall be replaced with an approved sod, and all damage to unmowed fields shall be seeded, in accordance with Section 250 and 252 of the Standard Specifications respectively. Restoration of the work area shall be incidental to the contract without any extra compensation allowed to the Contractor.

SUBMITTALS.

Revise Section 801.05 of the Standard Specifications to read:

The Contractor shall provide:

1. All material approval requests shall be submitted at the preconstruction meeting, including major traffic signal items listed in the table in Article 801.05.
2. All material or equipment which are similar or identical shall be the product of the same manufacturer, unless necessary for system continuity. Traffic signal materials and equipment shall bear the U.L. label whenever such labeling is available.
3. Seven (7) copies of a letter from the Traffic Signal Contractor on company letterhead listing the contract number or permit number, project location/limits, pay item description, pay code number, manufacturer's name and model numbers of the proposed equipment and stating that the proposed equipment meets all contract requirements. The letter will be reviewed by the Traffic Design Engineer to determine whether the equipment to be used is approvable.
4. Seven (7) copies of shop drawings for mast arm poles and assemblies, including combination mast arm poles, are required. A minimum of two (2) copies of all other material catalog cuts are required. Submittals for equipment and materials shall be complete. Partial or incomplete submittals will be returned without review.
5. Certain non-standard mast arm poles and assemblies will require additional review from IDOT's Central Office. Examples include ornamental/decorative and non-standard length mast arm pole assemblies. The Contractor shall account for the additional review time in his schedule.
6. The contract number or permit number, project location/limits and corresponding pay code number must be on each sheet of the letter, material catalog cuts and mast arm poles and assemblies drawings.
7. Where certifications and/or warranties are specified, the information submitted for approval shall include certifications and warranties. Certifications involving inspections, and/or tests of material shall be complete with all test data, dates, and times.
8. After the Engineer reviews the submittals for conformance with the design concept of the project, the Engineer will stamp the drawings indicating their status as 'Approved', 'Approved-As-Noted', 'Disapproved', or 'Information Only'. Since the Engineer's review is for conformance with the design concept only, it is the Contractor's responsibility to coordinate the various items into a working system as specified. The Contractor shall not be relieved from responsibility for errors or omissions in the shop, working, layout drawings, or other documents by the Department's approval thereof. The Contractor must still be in full compliance with contract and specification requirements.
9. All submitted items reviewed and marked 'APPROVED AS NOTED', or 'DISAPPROVED' are to be resubmitted in their entirety, unless otherwise indicated within the submittal comments, with a disposition of previous comments to verify contract compliance at no additional cost to the contract.
10. Exceptions, Deviations and Substitutions. In general, exceptions to and deviations from the requirements of the Contract Documents will not be allowed. It is the Contractor's responsibility to note any deviations from Contract requirements at the time of submittal and to make any requests for deviations in writing to the Engineer. In general, substitutions will not be acceptable. Requests for substitutions must demonstrate that the proposed substitution is superior to the material or equipment required by the Contract Documents. No exceptions, deviations or substitutions will be permitted without the approval of the Engineer.

MAINTENANCE AND RESPONSIBILITY.

Revise Section 801.11 of the Standard Specifications to read:

a) Existing traffic signal installations and/or any electrical facilities at all or various locations may be altered or reconstructed totally or partially as part of the work on this Contract. The Contractor is hereby advised that all traffic control equipment, presently installed at these locations, may be the property of the State of Illinois, Department of Transportation, Division of Highways, County, Private Developer, or the Municipality in which they are located. Once the Contractor has begun any work on any portion of the project all traffic signals within the limits of this contract or those which have the item "Maintenance of Existing Traffic Signal Installation", "Temporary Traffic Signal Installation(s)" and/or "Maintenance of Existing Flashing Beacon Installation", shall become the full responsibility of the Contractor. The Contractor shall supply the engineer and the Department's Electrical Maintenance Contractor a 24-hour emergency contact name and telephone number.

b) When the project has a pay item for "Maintenance of Existing Traffic Signal Installation", "Temporary Traffic Signal Installation(s)" and/or "Maintenance of Existing Flashing Beacon Installation", the Contractor must notify both the Area Traffic Signal Maintenance and Operations Engineer at (815) 334-4960 and the Department's Electrical Maintenance Contractor, of their intent to begin any physical construction work on the Contract or any portion thereof. This notification must be made a minimum of seven (7) working days prior to the start of construction to allow sufficient time for inspection of the existing traffic signal installation(s) and transfer of maintenance to the Contractor. If work is started prior to an inspection, maintenance of the traffic signal installation(s) will be transferred to the Contractor without an inspection. The Contractor will become responsible for repairing or replacing all equipment that is not operating properly or is damaged at no cost to the owner of the traffic signal. Final repairs or replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection otherwise the traffic signal installation will not be accepted.

c) Contracts such as pavement grinding or patching which result in the destruction of traffic signal loops do not require maintenance transfer, but require a notification of intent to work and an inspection. A minimum of seven (7) working days prior to the loop removal, the Contractor shall notify the Area Traffic Signal Maintenance and Operations Engineer at (815) 334-4960 and the Department's Electrical Maintenance Contractor, at which time arrangements will be made to adjust the traffic controller timing to compensate for the absence of detection. See additional requirements in these specifications under Inductive Loop Detector.

d) The Contractor is advised that the existing and/or temporary traffic signal installation must remain in operation during all construction stages, except for the most essential down time. Any shutdown of the traffic signal installation, which exceeds fifteen (15) minutes, must have prior approval of the Engineer. Approval to shutdown the traffic signal installation will only be granted during the period extending from 10:00 a.m. to 3:00 p.m. on weekdays. Shutdowns shall not be allowed during inclement weather or holiday periods.

e) The Contractor shall be fully responsible for the safe and efficient operation of the traffic signals. Any inquiry, complaint or request by the Department, the Department's Electrical Maintenance Contractor or the public, shall be investigated and repairs begun within one hour. Failure to provide this service will result in liquidated damages of $500 per day per occurrence. In addition, the Department reserves the right to assign any work not completed within this timeframe to the Electrical Maintenance Contractor. All costs associated to repair this uncompleted work shall be the responsibility of the Contractor. Failure to pay these costs to the Electrical Maintenance Contractor within one month after the incident will result in additional liquidated damages of $500 per month per occurrence. Unpaid bills will be deducted from the cost of the Contract. The

Department's Electrical Maintenance Contractor may inspect any signalizing device on the Department's highway system at any time without notification.

TRAFFIC SIGNAL INSPECTION (TURN-ON).

Revise Section 801.15(b) of the Standard Specifications to read:

It is the intent to have all electric work completed and equipment field tested by the vendor prior to the Department's "turn-on" field inspection. If in the event the Engineer determines work is not complete and the inspection will require more than two (2) hours to complete, the inspection shall be canceled and the Contractor will be required to reschedule at another date. The maintenance of the traffic signals will not be accepted until all punch list work is corrected and re-inspected.

When the road is open to traffic, except as otherwise provided in Section 850 of the Standard Specifications, the Contractor may request a turn-on and inspection of the completed traffic signal installation at each separate location. This request must be made to the Area Traffic Signal Maintenance and Operations Engineer at (815) 334-4960 a minimum of seven (7) working days prior to the time of the requested inspection. The Department will not grant a field inspection until notification is provided from the Contractor that the equipment has been field tested and the intersection is operating according to Contract requirements. The Department's facsimile number is (815) 334-4989. The Contractor must invite local fire department personnel to the turn-on when Emergency Vehicle Preemption (EVP) is included in the project. The Contractor must notify the SCAT Consultant of the turn-on schedule, as well as stage changes and phase changes during construction.

The Contractor must have all traffic signal work completed and the electrical service installation connected by the utility company prior to requesting an inspection and turn-on of the traffic signal installation. The Contractor shall be responsible to provide a police officer to direct traffic at the time of testing.

The Contractor shall provide a representative from the control equipment vendor's office to attend the traffic signal inspection for both permanent and temporary traffic signal turn-ons. Upon demonstration that the signals are operating and all work is completed in accordance with the Contract and to the satisfaction of the Engineer, the Engineer will then allow the signals to be placed in continuous operation. The Agency that is responsible for the maintenance of each traffic signal installation will assume the maintenance upon successful completion of this inspection.

The Department requires the following from the Contractor at traffic signal turn-ons.

1. One set of signal plans of record with field revisions marked in red ink.
2. Notification from the Contractor and the equipment vendor of satisfactory field testing.
3. A knowledgeable representative of the controller equipment supplier shall be required at the traffic signal turn-on. The representative shall be knowledgeable of the cabinet design and controller functions.
4. A copy of the approved material letter.
5. One (1) copy of the operation and service manuals of the signal controller and associated control equipment.
6. Five (5) copies (280 mm X 430 mm) 11" x 17" of the cabinet wiring diagrams.
7. Five (5) copies of the traffic signal installation cable log.
8. The controller manufacturer shall provide a printer at the turn-on to supply a printed form, not to exceed (280 mm X 430 mm) 11" x 17" for recording the traffic signal controller's timings; backup timings; coordination splits, offsets, and cycles; TBC Time of Day, Week and Year Programs; Traffic Responsive Program, Detector Phase Assignment, Type and Detector Switching; and any other functions programmable from the keyboard. The form shall include a location, date, manufacturer's name, controller model and software version. The form shall be approved by the Engineer and a minimum of three (3) copies must be furnished at

each turn-on. The manufacturer must provide all programming information used within the controller at the time of turn-on.

Acceptance of the traffic signal equipment by the Department shall be based upon inspection results at the traffic signal "turn on." If approved, traffic signal acceptance shall be verbal at the "turn on" inspection followed by written correspondence from the Engineer. The Contractor shall be responsible for all traffic signal equipment and associated maintenance thereof until Departmental acceptance is granted.

All equipment and/or parts to keep the traffic signal installation operating shall be furnished by the Contractor. No spare traffic signal equipment is available from the Department.

All punch list work shall be completed within two (2) weeks after the final inspection. The Contractor shall notify the Electrical Maintenance Contractor to inspect all punch list work. Failure to meet these time constraints shall result in liquidated damage charges of $500 per month per incident.

All cost of work and materials required to comply with the above requirements shall be included in the pay item bid prices, under which the subject materials and signal equipment are paid, and no additional compensation will be allowed. Materials and signal equipment not complying with the above requirements shall be subject to removal and disposal at the Contractor's expense.

LOCATING UNDERGROUND FACILITIES.

Revise Section 803.00 to the Standard Specifications to read:

If this Contract requires the services of an Electrical Contractor, the Contractor shall be responsible at his/her own expense for locating existing MCDOT electrical facilities prior to performing any work. If this Contract does not require the services of an Electrical Contractor, the Contractor may request one free locate for existing MCDOT electrical facilities from the Department's Electrical Maintenance Contractor prior to the start of any work. Additional requests may be at the expense of the Contractor. The location of underground traffic facilities does not relieve the Contractor of their responsibility to repair any facilities damaged during construction at their expense.

The exact location of all utilities shall be field verified by the Contractor before the installation of any components of the traffic signal system. For locations of utilities the local Counties or Municipalities may need to be contacted, in the City of Chicago contact D.I.G.G.E.R. at (312) 744-7000 and for all other locations contact J.U.L.I.E. at 1-800-892-0123.

ELECTRIC SERVICE INSTALLATION.

Revise Section 805.00 of the Standard Specifications to read:

Description. This work shall consist of all materials and labor required to install, modify, or extend the electric service installation. All installations shall meet the requirements of the details in the "District 1 Standard Traffic Signal Design Details" and applicable portions of the Specifications.

General. The electric service installation shall be the electric service disconnecting means and it shall be identified as suitable for use as service equipment.

The electric utility contact information is noted on the plans and represents the current information at the time of contract preparation. The Contractor must request in writing for service and/or service modification within 10 days of contract award and must follow-up with the electric utility to assure all necessary documents and payment are received by the utility. The Contractor shall forward copies of all correspondence between the contractor and utility company. The service agreement and sketch shall be submitted for signature to the Traffic Program's engineer.

Materials.

a. General. The completed control panel shall be constructed in accordance with UL Std. 508A, Industrial Control Panel, and carry the UL label. Wire terminations shall be UL listed.

b. Enclosures.
    1. Pole Mounted Cabinet. The cabinet shall be UL 50, NEMA Type 4X, unfinished single door design, fabricated from minimum 2.03 mm (0.080-inch) thick Type 5052 H-32 aluminum. Seams shall be continuous welded and ground smooth. Stainless steel screws and clamps shall secure the cover and assure a watertight seal. The cover shall be removable by pulling the continuous stainless steel hinge pin. The cabinet shall have an oil-resistant gasket and a lock kit shall be provided with an internal O-ring in the locking mechanism assuring a watertight and dust-tight seal. The cabinet shall be sized to adequately house all required components with extra space for arrangement and termination of wiring. A minimum size of 350 mm (14-inches) high, 225 mm (9-inches) wide and 200 mm (8-inches) in depth is required. The cabinet shall be channel mounted to a wooden utility pole using assemblies recommended by the manufacturer.

    2. Ground Mounted Cabinet. The cabinet shall be UL 50, NEMA Type 3R unfinished single door design with back panel. The cabinet shall be fabricated from Type 5052 H-32 aluminum with the frame and door 3.175 mm (0.125-inch) thick, the top 6.350 mm (0.250-inch) thick and the bottom 12.70 mm (0.500-inch) thick. Seams shall be continuous welded and ground smooth. The door and door opening shall be double flanged. The door shall be approximately 80% of the front surface, with a full length tamperproof stainless steel 1.91 mm (.075-inch) thick hinge bolted to the cabinet with stainless steel carriage bolts and nylocks nuts. The locking mechanism shall be slam-latch type with a keyhole cover. The cabinet shall be sized to adequately house all required components with extra space for arrangement and termination of wiring. A minimum size of 1000 mm (40-inches high), 400 mm (16-inches) wide and 375 mm (15-inches) in depth is required. The cabinet shall be mounted upon a square Type A concrete foundation as indicated on the plans. The foundation is paid for separately.

c. Surge Protector. Overvoltage protection, with LED indicator, shall be provided for the 120 volt load circuit by the means MOV and thermal fusing technology. The response time shall be <5n seconds and operate within a range of –40C to +85C. The surge protector shall be UL 1449 Listed.

d. Circuit Breakers. Circuit breakers shall be standard UL listed molded case, thermal-magnetic bolt-on type circuit breakers with trip free indicating handles. 120 volt circuit breakers shall have an interrupting rating of not less than 65,000 rms symmetrical amperes. Unless otherwise indicated, the main disconnect circuit breaker for the traffic signal controller shall be rated 60 amperes, otherwise noted on the plans, 120 V and the auxiliary circuit breakers shall be rated 10 amperes, 120 V.

e. Fuses, Fuseholders and Power Indicating Light. Fuses shall be small-dimensional cylindrical fuses of the dual element time-delay type. The fuses shall be rated for 600 V AC and shall have a UL listed interrupting rating of not less than 10,000 rms symmetrical amperes at rated voltage. The power indicating light shall be LED type with a green colored lens and shall be energized when electric utility power is present.

f. Ground and Neutral Bus Bars. A single copper ground and neutral bus bar, mounted on the equipment panel shall be provided. Ground and neutral conductors shall be separated on the bus bar. Compression lugs, plus 2 spare lugs, shall be sized to accommodate the cables with the heads of the connector screws painted green for ground connections and white for neutral connections.

g. Utility Services Connection. The Contractor shall notify the Utility Company marketing representative a minimum of 30 working days prior to the anticipated date of hook-up. This 30 day advance notification will begin only after the Utility Company marketing representative has received service charge payments from the Contractor. Prior to contacting the Utility Company marketing representative for service connection, the service installation controller cabinet and cable must be installed for inspection by the Utility Company.

h. Ground Rod. Ground rods shall be copper-clad steel, a minimum of 3.0 meters (10') in length, and 20mm (3/4") in diameter. Ground rod resistance measurements to ground shall be 25 ohms or less. If necessary additional rods shall be installed to meet resistance requirements at no additional cost to the contract.

Installation

a. General. The Contractor shall confirm the orientation of the traffic service installation and its door side with the engineer, prior to installation. All conduit entrances into the service installation shall be sealed with a pliable waterproof material.

b. Pole Mounted. Brackets designed for pole mounting shall be used. All mounting hardware shall be stainless steel. Mounting height shall be as noted on the plans or as directed by the Engineer.

c. Ground Mounted. The service installation shall be mounted plumb and level on the foundation and fastened to the anchor bolts with hot-dipped galvanized or stainless steel nuts and washers. The space between the bottom of the enclosure and the top of the foundation shall be caulked at the base with silicone.

Basis of Payment. The service installation shall be paid for at the contract unit price each for SERVICE INSTALLATION of the type specified which shall be payment in full for furnishing and installing the service installation complete. The type A foundation, which includes the ground rod shall be paid for separately. SERVICE INSTALLATION, POLE MOUNTED shall include the 20mm (3/4") grounding conduit, ground rod, and pole mount assembly. Any changes by the utility companies shall be approved by the engineer and paid for as an addition to the contract according to Article 109.05 of the Standard Specifications.

GROUNDING OF TRAFFIC SIGNAL SYSTEMS.

General. All traffic signal systems, equipment and appurtenances shall be properly grounded in strict conformance with the NEC. See IDOT District 1 Traffic Signal detail plan sheet for additional information.

The grounding electrode system shall include a ground rod installed with each traffic signal controller concrete foundation and all mast arm and post concrete foundations. An additional ground rod will be required at locations were measured resistance exceeds 25 ohms. Ground rods are included in the applicable foundation paid item and will not be paid for separately.

Testing shall be according to Section 801.13(a) (4) and (5).

a) The grounded conductor (neutral conductor) shall be white color coded. This conductor shall be bonded to the equipment grounding conductor only at the Electric Service Installation. All power cables shall include one neutral conductor of the same size.

b) The equipment grounding conductor shall be green color coded. The following is in addition to Section 801.04 of the Standard Specifications.

   1) Equipment grounding conductors shall be XLP insulated No. 6, unless otherwise noted on the plans, and bonded to the grounded conductor (neutral conductor) only at the Electric Service

Installation. The equipment grounding conductor is paid for separately and shall be continuous. The Earth shall not be used as the equipment grounding conductor.

2) Equipment grounding conductor*s* shall be bonded, using a Listed grounding connector, to all traffic signal mast arm poles, traffic signal posts, pedestrian posts, pull boxes, handhole frames and covers and other metallic enclosures throughout the traffic signal wiring system, except where noted herein. A Listed electrical joint compound shall be applied to all conductors terminations, connector threads and contact points.

3) All metallic and non-metallic raceways containing traffic signal circuit runs shall have a continuous equipment grounding conductor, except raceways containing only detector loop lead-in circuits, circuits under 50 volts and/or fiber optic cable will not be required to include an equipment grounding conductor.

4) Individual conductor splices in handholes shall be soldered and sealed with heat shrink. When necessary to maintain effective equipment grounding, a full cable heat shrink shall be provided over individual conductor heat shrinks.

c) The grounding electrode conductor shall be similar to the equipment grounding conductor in color coding (green) and size. The grounding electrode conductor is used to connect the ground rod to the equipment grounding conductor and is bonded to ground rods via exothermic welding, listed pressure connectors, listed clamps or other approved listed means.

GROUNDING EXISTING HANDHOLE FRAME AND COVER.

Description.
This work shall consist of all materials and labor required to bond the equipment grounding conductor to the existing handhole frame and handhole cover. All installations shall meet the requirements of the details in the "District One Standard Traffic Signal Design Details" and applicable portions of the Specifications.

The equipment grounding conductor shall be bonded to the handhole frame and to the handhole cover. Two (2) ½-inch diameter x 1 ¼-inch long hex-head stainless steel bolts, spaced 1.75-inches apart center-to-center shall be fully welded to the frame and to the cover to accommodate a heavy duty Listed grounding compression terminal (Burndy type YGHA or approved equal). The grounding compression terminal shall be secured to the bolts with stainless steel split-lock washers and nylon-insert locknuts.

Welding preparation for the stainless steel bolt hex-head to the frame and to the cover shall include thoroughly cleaning the contact and weldment area of all rust, dirt and contaminates. The Contractor shall assure a solid strong weld. The welds shall be smooth and thoroughly cleaned of flux and spatter. The grounding installation shall not affect the proper seating of the cover when closed.

The grounding cable shall be paid for separately.

Method of Measurement.
Units measured for payment will be counted on a per handhole basis, regardless of the type of handhole and its location.

Basis of Payment.
This work shall be paid for at the contract unit price each for GROUNDING EXISTING HANDHOLE FRAME AND COVER which shall be payment in full for grounding the handhole complete.

GROUNDING CABLE.

The cable shall meet the requirements of Section 817 of the "Standard Specifications," except for the following:

Add to Section 817.02 (b) of the Standard Specifications:

Unless otherwise noted on the Plans, traffic signal grounding conductor shall be one conductor, #6 gauge copper, with a XLP jacket.

The traffic signal grounding conductor shall be bonded, using a Listed grounding connector (Burndy type KC/K2C, as applicable, or approved equal), to all proposed and existing traffic signal mast arm poles and traffic/pedestrian signal posts, including push button posts. The grounding conductor shall be bonded to all proposed and existing pull boxes, handhole frames and covers and other metallic enclosures throughout the traffic signal wiring system and noted herein and detailed on the plans. Bonding to existing handhole frames and covers shall be paid for separately.

Revise Section 817.05 of the Standard Specifications to read:

Basis of Payment. Grounding cable shall be measured in place for payment in (meter) foot. Payment shall be at the contract unit price for ELECTRIC CABLE IN CONDUIT, GROUNDING, NO. 6, 1C, which price includes all associated labor and material including grounding clamps, splicing, exothermic welds/other Listed connectors and hardware.

HANDHOLES.

Add the following to Section 814.00 of the Standard Specifications:

All handholes shall be concrete, poured in place, with inside dimensions of 549 mm (21-1/2") minimum. Frames and lid openings shall match this dimension. The cover of the handhole frame shall be labeled “Traffic Signals" with legible raised letters.

For grounding purposes the handhole frame shall have provisions for a 15.875 mm (7/16”) diameter stainless bolt cast into one corner of the frame. The covers shall have a stainless steel threaded stint extended from the eye hook assembly for the purpose of attaching the grounding conductor to the handhole frame.

The minimum wall thickness for heavy duty hand holes shall be 300 mm (12 inches).

All conduits shall enter the handhole at a depth of (760 mm) 30" except for the conduits for detector loops when the handhole is less than (1.52 m) 5’ from the detector loop. All conduit ends should be sealed with a waterproof sealant to prevent the entrance of contaminants into the handhole.

Steel cable hooks shall be coated with hot-dipped galvanization in accordance with AASHTO Specification M111. Hooks shall be a minimum of 1/2 inch (12.7 mm) diameter with two 90 degree bends and extend into the handhole at least 6 inches (150 mm). Hooks shall be placed a minimum of 12 inches (300 mm) below the lid or lower if additional space is required.

FIBER OPTIC TRACER CABLE.

The cable shall meet the requirements of Section 817 of the "Standard Specifications," except for the following:

Add to Section 817.03 of the Standard Specifications:

In order to trace the fiber optic cable after installation, the tracer cable shall be installed in the same conduit as the fiber optic cable. The tracer cable shall be continuous, extended into the controller cabinet and terminated on a terminal strip mounted on the side wall of the controller cabinet. The terminal strip and tracer cable shall be clearly marked and identified. The tracer cable will be allowed to be spliced at the handholes only. All tracer cable splices shall be kept to a minimum and shall incorporate maximum

lengths of cable supplied by the manufacturer. The tracer cable splice shall use a Western Union Splice soldered with resin core flux. All exposed surfaces of the solder shall be smooth. Splices shall be soldered using a soldering iron. Blow torches or other devices which oxidize copper cable shall not be allowed for soldering operations. The splice shall be covered with WCSMW 30/100 heat shrink tube, minimum length (100 mm) 4" and with a minimum (25 mm) 1" coverage over the XLP insulation, underwater grade.

Revise Section 817.05 of the Standard Specifications to read:

Basis of Payment: The tracer cable shall be paid for separately as ELECTRIC CABLE IN CONDUIT, TRACER, NO. 14 1C per (meter) foot, which price shall include all associated labor and material for installation.

RAILROAD INTERCONNECT CABLE.

The cable shall meet the requirements of Section 817 of the "Standard Specifications," except for the following:

Add to Section 817.02 of the Standard Specifications:

The cable shall be three conductor standard #14 copper cable in a clear polyester binder, shielded with #36 AWG tinned copper braid with 85% coverage, and insulated with .016" polyethylene (black, blue, red). The jacket shall be black 0.045 PVC or polyethylene.

Revise Section 817.05 of the Standard Specifications to read:

Basis of Payment. This work shall be paid for at the contract unit price per (meter) foot for ELECTRIC CABLE IN CONDUIT, RAILROAD, NO. 14 3C, which price shall be payment in full for furnishing, installing, and making all electrical connections in the traffic signal controller cabinet. Connections in the railroad controller cabinet shall be performed by railroad personnel.

MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION.

Revise Section 850.00 of the Standard Specifications to read:

The energy charges for the operation of the traffic signal installation shall be paid for by others. Full maintenance responsibility shall start as soon as the Contractor begins any physical work on the Contract or any portion thereof.

The Contractor shall have on staff electricians with IMSA Level II certification to provide signal maintenance.

This item shall include maintenance of all traffic signal equipment at the intersection, including emergency vehicle pre-emption equipment, master controllers, uninterruptible power supply (UPS and batteries), telephone service installations, communication cables and conduits to adjacent intersections.

The maintenance shall be according to District 1 revised Article 801.11 and the following contained herein.

The Contractor shall check all controllers every two (2) weeks, which will include visually inspecting all timing intervals, relays, detectors, and pre-emption equipment to ensure that they are functioning properly. This item includes, as routine maintenance, all portions of emergency vehicle pre-emption equipment. The Contractor shall maintain in stock at all times a sufficient amount of materials and equipment to provide effective temporary and permanent repairs.

The Contractor shall provide immediate corrective action when any part or parts of the system fail to function properly. Two far side heads facing each approach shall be considered the minimum acceptable signal operation pending permanent repairs. When repairs at a signalized intersection require that the controller be disconnected, and power is available, the Contractor shall place the traffic signal installation on flashing operation. The signals shall flash RED for all directions unless a different indication has been specified by the Engineer. The Contractor shall be required to place stop signs (R1-1-36) at each approach of the intersection as a temporary means of regulating traffic. At approaches where a yellow flashing indication is necessary, as directed by the Engineer, stop signs will not be required. The Contractor shall furnish and equip all their vehicles assigned to the maintenance of traffic signal installations with a sufficient number of stop signs as specified herein. The Contractor shall maintain a sufficient number of spare stop signs in stock at all times to replace stop signs which may be damaged or stolen.

The Contractor shall provide the Engineer with a 24 hour telephone number for the maintenance of the traffic signal installation and for emergency calls by the Engineer.

Traffic signal equipment, which is lost or not returned to the Department for any reason shall be replaced with new equipment meeting the requirements of these Specifications.

The Contractor shall respond to all emergency calls from the Department or others within one hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the Contractor shall replace it with new and identical equipment. The cost of furnishing and installing the replaced equipment shall be borne by the Contractor at no additional charge to the County. The Contractor may institute action to recover damages from a responsible third party. If at any time the Contractor fails to perform all work as specified herein to keep the traffic signal installation in proper operating condition or if the Engineer cannot contact the Contractor's designated personnel, the Engineer shall have the County's Electrical Maintenance Contractor perform the maintenance work required. The County's Electrical Maintenance Contractor shall bill the Contractor for the total cost of the work. The Contractor shall pay this bill within thirty (30) days of the date of receipt of the invoice or the cost of such work will be deducted from the amount due the Contractor. The Contractor shall allow the Electrical Maintenance Contractor to make reviews of the Existing Traffic Signal Installation that has been transferred to the Contractor for Maintenance.

Basis of Payment. This work shall be paid for at the contract unit price each for MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION.

TRAFFIC ACTUATED CONTROLLER.

Add the following to Section 857.02 of the Standard Specifications:

Controllers shall be NEMA TS2 Type 1 compatible, Econolite ASC3-2100 unless specified otherwise on the plans or elsewhere on these specifications. Only controllers supplied by one of the District 1 approved closed loop equipment manufacturers will be allowed. The controller shall be the most recent model and software version supplied by the manufacturer at the time of the approval. The traffic signal controller shall provide features to inhibit simultaneous display of a circular yellow ball and a yellow arrow display. Individual load switches shall be provided for each vehicle, pedestrian, and right turn over lap phase. The controller shall prevent phases from being skipped during program changes and after all preemption events. The controller shall be equipped with an Ethernet port and removable data key to save the controller database.

MASTER CONTROLLER.

Revise Sections 860.02 - Materials and 860.03 - Installation of the Standard Specifications to read:

Only controllers supplied by one of the District approved closed loop equipment manufacturers will be allowed. Only NEMA TS 2 Type 1 Econolite closed loop systems shall be supplied. The latest model and software version of master controller shall be supplied.

Functional requirements in addition to those in section 863 of the Standard Specification include:

By December 31, 2002, the Master Controller shall provide a background timer which will prevent phases from being skipped during program changes.

The system commands shall consist of, as a minimum, six (6) cycle lengths, five (5) offsets, three (3) splits, and four (4) special functions. The system commands shall also include commands for free or coordinated operation.

Traffic Responsive operation shall consist of the real time acquisition of system detector data, data validation, and the scaling of acquired volumes and occupancies in a deterministic fashion so as to cause the selection and implementation of the most suitable traffic plan.

Upon request by the Engineer, each master shall be delivered with up to three (3) complete sets of the latest edition of registered remote monitoring software with full manufacture's support. Each set shall consist of software on CD, DVD, or other suitable media approved by the Engineer, and a bound set of manuals containing loading and operating instruction. One copy of the software and support data shall be delivered to the Agency in charge of system operation, if other than IDOT. One of these two sets will be provided to the Agency Signal Maintenance Contractor for use in monitoring the system.

The approved manufacturer of equipment shall loan the District one master controller and two intersection controllers of the most recent models and the newest software version to be used for instructional purposes in addition to the equipment to be supplied for the Contract.

The Contractor shall arrange to install a standard voice-grade dial-up telephone line to the master controller. This shall be accomplished through the following process utilizing District One staff. This telephone line may be coupled with a DSL line and a phone filter to isolate the dial-up line. An E911 address is required.

The cabinet shall be provided with an Outdoor Network Interface for termination of the telephone service. It shall be mounted to the inside of the cabinet in a location suitable to provide access for termination of the telephone service at a later date.

Full duplex communication between the master and its local controllers is recommended, but at this time not required. The data rate shall be 1200 baud minimum and shall be capable of speeds to 38,400 or above as technology allows. The controller, when installed in an Ethernet topology, may operate non-serial communications.

The master controller shall be furnished with a NEMA rated Econolite 56K industrial modem.

The cabinet shall be provided with a Siecor CAC 3000, or equivalent, Outdoor Network Interface for termination of the telephone service. It shall be mounted to the inside of the cabinet in a location suitable to provide access for termination of the telephone service at a later date. The CAC 3000 shall be equipped with a standard Three-Electrode Heavy Duty Gas Tube Surge Arrestor.

The cabinet shall provide a caller identification unit with 50 number memory.

Each master shall be delivered with up to three (3) complete sets of the latest edition of registered remote monitoring software with full manufacture's support. Each set shall consist of software on suitable media (CD, 3 1/2" or 5 1/4" floppy disks as requested by the Engineer), and a bound set of manuals containing loading and operating instruction. One copy of the software and support data shall be delivered to the

Agency in charge of system operation, if other than IDOT. One of these two sets will be provided to the Agency Signal Maintenance Contractor for his use in monitoring the system.

The Contractor shall be required to setup graphic displays and all software parameters for every intersection to be interconnected under this Contract, including complete viewing and control capabilities from IDOT remote monitor.

The approved manufacturer of equipment shall loan the District one master controller and two intersection controllers of the most recent models and the newest software version to be used for instructional purposes in addition to the equipment to be supplied for the Contract.

The Contractor shall arrange to install a standard voice-grade dial-up telephone line to the master controller. This shall be accomplished through the following process utilizing Department staff.

As soon as practical or within one week after the contract has been awarded, the Contractor shall contact (via phone) the Traffic Engineer at the McHenry County Division of Transportation at (815) 334-4960 to request a phone line installation.

A follow-up fax transmittal to the Traffic Engineer (815-334-4989) with all required information pertaining to the phone installation is required from the Contractor as soon as possible or within one week after the initial request has been made. The required information to be supplied on the fax shall include (but not limited to): A street address for the new traffic signal controller (or nearby address); a nearby existing telephone number; what type of telephone service is needed; the name and number of the Contractor's employee for the telephone company to contact regarding site work and questions.

The usual time frame for the activation of the phone line is 4-6 weeks after the MCDOT has received the Contractor supplied fax. It is, therefore, imperative that the phone line conduit and pull-string be installed by the Contractor in anticipation of this time frame. On jobs which include roadway widening in which the conduit cannot be installed until this widening is completed, the Contractor will be allowed to delay the phone line installation request to the Business Services Section until a point in time that is 4-6 weeks prior to the anticipated completion of the traffic signal work. The contractor shall provide the Administrative Support Manager with an expected installation date considering the 4-6 week processing time.

The telephone line shall be installed and activated one month before the system final inspection.

All costs associated with the telephone line installation and activation (not including the Contract specified conduit installation between the point of telephone service and the traffic signal controller cabinet) shall be paid for by the McHenry County Division of Transportation (i.e., this will be an MCDOT phone number not a Contractor phone number).

FIBER OPTIC CABLE.

Add the following to Articles 871.01, 872.02, 871.04, and 871.05 of the Standard Specifications:

This work shall consist of furnishing and installing Fiber Optical cable in conduit with all accessories and connectors according to Section 871 of the Standard Specifications. The cable shall be of the type, size, and the number of fiber specified.

The control cabinet distribution enclosure shall be CSC FTWO12KST-W/O 12 Port Fiber Wall Enclosure or an approved equivalent. The fiber optic cable shall provide six fibers per tube for the amount of fibers called for in the Fiber Optic Cable pay item in the Contract. A minimum of six multimode fibers from each cable shall be terminated with approved mechanical connectors at the distribution enclosure. Fibers not being used shall be labeled “spare." Fibers not attached to the distribution enclosure shall be capped and sealed. A minimum of 13.0 feet (4m) of extra cable length shall be provided for the controller cabinet. The controller cabinet extra cable length shall be stored as directed by the Engineer.

Fiber Optic cable may be gel filled or an approved water blocking tape.

Basis of Payment. The work shall be paid for at the contract unit price for FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, MM12F SM12F, per (meter) foot for the cable in place, including distribution enclosure and all connectors.

CONCRETE FOUNDATIONS.

Add the following to Section 878.03 of the Standard Specifications:

All anchor bolts shall be according to Section 1006.09, except all anchor bolts shall be hot dipped galvanized the full length of the anchor bolt including the hook.

Concrete Foundations, Type "A" for Traffic Signal Posts shall provide anchor bolts with the bolt pattern specified within the "District 1 Standard Traffic Signal Design Details." All Type “A" foundations shall be a minimum depth of 1.22 m (48”).

Concrete Foundations, Type “C” for Traffic Signal Cabinets with Uninterruptible Power Supply (UPS) cabinet installations shall be a minimum of 48 inches (1.22 m) long and 31 inches (790 mm) wide. All Type “C” foundations shall be a minimum depth of 48 inches (1.22 m). An integral concrete pad to support the UPS cabinet shall be constructed a minimum of 20 inches (510 mm) long, 31 inches (790 mm) wide (same width as that of controller foundation), and a minimum depth of 10 inches (250 mm). The concrete pad for the UPS cabinet shall be construction of the signal power panel side of the controller foundation. The concrete apron in front of the Type IV or V cabinet shall be 36 in. x 48 in. x 5 in. (910 mm X 1220 mm X 130 mm). The concrete apron in front of the UPS cabinet shall be 36 in. x 31 in. x 5 in. (910 mm X 790 mm X 130 mm). Anchor bolts shall provide bolt spacing as required by the manufacturer.

Concrete Foundations, Type “D” for Traffic Signal Cabinets shall be a minimum of 48 inches (1.22 m) long and 31 inches (790 mm) wide. All Type “D” foundations shall be a minimum depth of 48 inches (1.22 m). The concrete apron shall be 36 in. x 48 in. x 5 in. (910 mm X 1220 mm X 130 mm). Anchor bolts shall provide bolt spacing as required by the manufacturer.

Concrete Foundations, Type "E" for Mast Arm and Combination Mast Arm Poles shall meet the following requirements:

Table 1
DESIGN TABLE FOR MAST ARM FOUNDATIONS

MAST ARM LENGTH	FOUNDATION DEPTH*	FOUNDATION DIAMETER	SPIRAL DIAMETER	QUANTITY OF NO. 15 (NO. 5) BARS
Less than 9.1m (30’)	10’-0” (3.0m)	30“ (750mm)	24” (600mm)	8
Greater than or equal to 9.1m (30’) and less than 12.2m (40’)	13’-6” (4.1m)	30“ (750mm)	24” (600mm)	8
	11’-0” (3.4m)	36” (900mm)	30” (750mm)	12
Greater than or equal to 12.2m (40’) and less than 15.2m (50’)	13’-0” (4.0m)	36” (900mm)	30” (750mm)	12
Greater than or equal to 15.2m (50’) and up to 16.8m (55’)	15’-0” (4.6m)	36” (900mm)	30” (750mm)	12

Foundation depths specified are for sites which have cohesive soils (clayey, silt, sandy clay, etc.) along the length of the shaft, with an average Unconfined Compressive strength of (Qu)>1.0 tsf (100kPa). This strength shall be verified by boring data prior to construction or with testing by the Engineer during foundation drilling. The Bureau of Bridges & Structures should be contacted for a revised design if other conditions are encountered.

Concrete Foundations, Type "E" for Combination Mast Arm Poles shall be 36 inch (900 mm) diameter, regardless of mast arm length. Foundations used for Combination Mast Arm Poles shall provide an extra 2-1/2 inch (65 mm) raceway.

No foundation is to be poured until the Resident Engineer gives his/her approval as to the depth of the foundation.

DETECTOR LOOP.

Revise Section 886 of the Standard Specifications to read:

A minimum of seven (7) working days prior to the Contractor cutting loops, the Contractor shall have the proposed loop locations marked and contact the Area Traffic Signal Maintenance and Operations Engineer (815) 334-4960 to inspect and approve the layout. When preformed detector loops are installed, the Contractor shall have them inspected and approved prior to the pouring of the portland cement concrete surface, using the same notification process as above.

Loop detectors shall be installed according to the requirements of the "District 1 Standard Traffic Signal Design Details". Saw-cuts (homeruns on preformed detector loops) from the loop to the edge of pavement shall be made perpendicular to the edge of pavement when possible in order to minimize the length of the saw-cut (homerun on preformed detector loops) unless directed otherwise by the Engineer or as shown on the plan.

The detector loop cable insulation shall be labeled with the cable specifications.

Each loop detector lead-in wire shall be labeled in the handhole using a Panduit 250W175C water proof tag, or an approved equal, secured to each wire with nylon ties.

Resistance to ground shall be a minimum of 100 mega-ohms under any conditions of weather or moisture. Inductance shall be more than 50 and less than 700 microhenries. Quality readings shall be more than 5.

(a) Type I. All loops installed in new asphalt pavement shall be installed in the binder course and not in the surface course. The edge of pavement, curb and handhole shall be cut with a 6.3 mm (1/4") deep x 100 mm (4") saw cut to mark location of each loop lead-in.

Loop sealant shall be a two-component thixotropic chemically cured polyurethane either Chemque Q-Seal 295, Percol Elastic Cement A/C Grade or an approved equal. The sealant shall be installed 3 mm (1/8") below the pavement surface, if installed above the surface the overlap shall be removed immediately.

Detector loop measurements shall include the saw cut and the length of the loop lead-in to the edge of pavement. The lead-in wire, including all necessary connections for proper operations, from the edge of pavement to the handhole, shall be incidental to the price of the detector loop. Unit duct, trench and backfill, and drilling of pavement or handholes shall be incidental to detector loop quantities.

(b) Preformed. This work shall consist of furnishing and installing a rubberized heat resistant preformed traffic signal loop in accordance with the Standard Specifications, except for the following:

Preformed detector loops shall be installed in new pavement constructed of Portland cement concrete using mounting chairs or tied to re-bar or the preformed detector loops may be placed in the sub-base. Loop lead-ins shall be extended to a temporary enclosure near the proposed handhole location with ends capped and sealed against moisture and other contaminants.

Handholes shall be placed next to the shoulder or back of curb when preformed detector loops enter the handhole. Non-metallic coilable duct, included in this pay item, shall be used to protect the preformed lead-ins from back of curb to the handhole.

Preformed detector loops shall be factory assembled. Homeruns and interconnects shall be pre-wired and shall be an integral part of the loop assembly. The loop configurations and homerun lengths shall be assembled for the specific application. The loop and homerun shall be constructed using 17.2 mm (11/16") outside diameter (minimum), 9.5 mm (3/8") inside diameter (minimum) Class A oil resistant synthetic cord reinforced hydraulic hose with 1,720 kPa (250 psi) internal pressure rating. Hose for the loop and homerun assembly shall be one continuous piece. No joints or splices shall be allowed in the hose except where necessary to connect homeruns or interconnects to the loops. This will provide maximum wire protection and loop system strength. Hose tee connections shall be heavy duty high temperature synthetic rubber. The tee shall be of proper size to attach directly to the hose, minimizing glue joints. The tee shall have the same flexible properties as the hose to insure that the whole assembly can conform to pavement movement and shifting without cracking or breaking. The wire used shall be #16 THWN stranded copper. The number of turns in the loop shall be application specific. Homerun wire pairs shall be twisted a minimum of four turns per foot. No wire splices will be allowed in the preformed loop assembly. The loop and homeruns shall be filled and sealed with a flexible sealant to insure complete moisture blockage and further protect the wire.

Basis of Payment. This work shall be paid for at the contract unit price per meter (foot) for DETECTOR LOOP, TYPE I or PREFORMED DETECTOR LOOP as specified in the plans, which price shall be payment in full for furnishing and installing the detector loop and all related connections for proper operation.

EMERGENCY VEHICLE PRIORITY SYSTEM.

Revise Section 887.00 of the Standard Specifications to read:

It shall be the Contractor's responsibility to contact the municipality or fire district to verify the brand of emergency vehicle pre-emption equipment to be installed prior to the contract bidding. The equipment must be completely compatible with all components of the equipment currently in use by the Agency.

All new installations shall be equipped with Confirmation Beacons as shown on the "District One Standard Traffic Signal Design Details." The Confirmation Beacon shall consist of a 6 watt Par 38 LED flood lamp with a 30 degree light spread, maximum 6 watt energy consumption at 120V, and a 2,000 hour warranty for each direction of pre-emption. The lamp shall have an adjustable mount with a weatherproof enclosure for cable splicing. All hardware shall be cast aluminum or stainless steel. Holes drilled into signal poles, mast arms, or posts shall require rubber grommets. In order to maintain uniformity between communities, the confirmation beacons shall indicate when the control equipment receives the pre-emption signal. The pre-emption movement shall be signalized by a flashing indication at the rate specified by Section 4D-11 of the "Manual on Uniform Traffic Control Devices." The stopped pre-empted movements shall be signalized by a continuous indication.

All light operated systems shall operate at a uniform rate of 14.035 Hz ±0.002, or as otherwise required by the Engineer, and provide compatible operation with other light systems currently being operated in the District.

Basis of Payment. The work shall be paid for at the contract unit price each for furnishing and installing LIGHT DETECTOR and LIGHT DETECTOR AMPLIFIER. Furnishing and installing the confirmation beacon shall be incidental to the cost of the Light Detector. The preemption detector amplifier shall be paid for on a basis of (1) one each per intersection controller and shall provide operation for all movements required in the pre-emption phase sequence.

RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM

Description.
This work shall consist of re-optimizing a closed loop traffic signal system according to the following Levels of work.

LEVEL I applies when improvements are made to an existing signalized intersection within an existing closed loop traffic signal system. The purpose of this work is to integrate the improvements to the subject intersection into the signal system while minimizing the impacts to the existing system operation. This type of work would be commonly associated with the addition of signal phases, pedestrian phases, or improvements that do not affect the capacity at an intersection.

LEVEL II applies when improvements are made to an existing signalized intersection within an existing closed loop traffic signal system and detailed analysis of the intersection operation is desired by the engineer, or when a new signalized or existing signalized intersection is being added to an existing system, but optimization of the entire system is not required. The purpose of this work is to optimize the subject intersection, while integrating it into the existing signal system with limited impact to the system operations. This item also includes an evaluation of the overall system operation, including the traffic responsive program.

For the purposes of re-optimization work, an intersection shall include all traffic movements operated by the subject controller and cabinet.

After the signal improvements are completed, the signal shall be re-optimized as specified by an approved Consultant who has previous experience in optimizing Closed Loop Traffic Signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (815) 334-4960 for a listing of approved Consultants. Traffic signal system optimization work, including fine-tuning adjustments of the optimized system, shall follow the requirements stated in the most recent IDOT District 1 SCAT Guidelines, except as note herein.

A listing of existing signal equipment, interconnect information, phasing data, and timing patterns may be obtained from the Department, if available and as appropriate. The existing SCAT Report is available for review at the District One office and if the Consultant provides blank computer disks, copies of computer simulation files for the existing optimized system and a timing database that includes intersection displays will be made for the Consultant. The Consultant shall confer with the Traffic Signal Engineer prior to optimizing the system to determine if any extraordinary conditions exist that would affect traffic flows in the vicinity of the system, in which case, the Consultant may be instructed to wait until the conditions return to normal or to follow specific instructions regarding the optimization.

(a) LEVEL I Re-Optimization

1. The following tasks are associated with LEVEL I Re-Optimization.
    a. Appropriate signal timings shall be developed for the subject intersection and existing timings shall be utilized for the rest of the intersections in the system.
    b. Proposed signal timing plan for the new or modified intersection(s) shall be forwarded to IDOT for review prior to implementation.
    c. Consultant shall conduct on-site implementation of the timings at the turn-on and make fine-tuning adjustments to the timings of the subject intersection in the field to alleviate observed adverse operating conditions and to enhance operations.

2. The following deliverables shall be provided for LEVEL I Re-Optimization.
   a. Consultant shall furnish to IDOT a cover letter describing the extent of the re-optimization work performed.
   b. Consultant shall furnish an updated intersection graphic display for the subject intersection to IDOT and to IDOT's Traffic Signal Maintenance Contractor.

(b) LEVEL II Re-Optimization

1. In addition to the requirements described in the LEVEL I Re-Optimization above, the following tasks are associated with LEVEL II Re-Optimization.
   a. Traffic counts shall be taken at the subject intersection after the traffic signals are approved for operation by the Area Traffic Signal Operations Engineer. Manual turning movement counts shall be conducted from 6:30 a.m. to 9:30 a.m., 11:00 a.m. to 1:00 p.m., and 3:30 p.m. to 6:30 p.m. on a typical weekday from midday Monday to midday Friday. The turning movement counts shall identify cars, and single-unit, multi-unit heavy vehicles, and transit buses.
   b. As necessary, the intersections shall be re-addressed and all system detectors reassigned in the master controller according to the current standard of District One.
   c. Traffic responsive program operation shall be evaluated to verify proper pattern selection and lack of oscillation and a report of the operation shall be provided to IDOT.

2. The following deliverables shall be provided for LEVEL II Re-Optimization.
   a. Consultant shall furnish to IDOT one (1) copy of a technical memorandum for the optimized system. The technical memorandum shall include the following elements:
      (1) Brief description of the project
      (2) Printed copies of the analysis output from Synchro (or other appropriate, approved optimization software file)
      (3) Printed copies of the traffic counts conducted at the subject intersection
   b. Consultant shall furnish to IDOT two (2) CDs for the optimized system. The CDs shall include the following elements:
      (1) Electronic copy of the technical memorandum in PDF format
      (2) Revised Synchro files (or other appropriate, approved optimization software file) including the new signal and the rest of the signals in the closed loop system
      (3) Traffic counts conducted at the subject intersection
      (4) New or updated intersection graphic display file for the subject intersection
      (5) The CD shall be labeled with the IDOT system number and master location, as well as the submittal date and the consultant logo. The CD case shall include a clearly readable label displaying the same information securely affixed to the side and front.

Basis of Payment.
This work shall be paid for at the contract unit price each for RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM – LEVEL I or RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM – LEVEL II, which price shall be payment in full for performing all work described herein per intersection. Following completion of the timings and submittal of specified deliverables, 100 percent of the bid price will be paid.

OPTIMIZE TRAFFIC SIGNAL SYSTEM

Description.
This work shall consist of optimizing a closed loop traffic signal system.

OPTIMIZE TRAFFIC SIGNAL SYSTEM applies when a new or existing closed loop traffic signal system is to be optimized and a formal Signal Coordination and Timing (SCAT) Report is to be prepared. The purpose of this work is to improve system performance by optimizing traffic signal timings, developing a time of day program and a traffic responsive program.

After the signal improvements are completed, the signal system shall be optimized as specified by an approved Consultant who has previous experience in optimizing Closed Loop Traffic Signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (815) 334-4960 for a listing of approved Consultants. Traffic signal system optimization work, including fine-tuning adjustments of the optimized system, shall follow the requirements stated in the most recent IDOT District 1 SCAT Guidelines, except as note herein.

A listing of existing signal equipment, interconnect information, phasing data, and timing patterns may be obtained from the Department, if available and as appropriate. The existing SCAT Report is available for review at the District One office and if the Consultant provides blank computer disks, copies of computer simulation files for the existing optimized system and a timing database that includes intersection displays will be made for the Consultant. The Consultant shall confer with the Traffic Signal Engineer prior to optimizing the system to determine if any extraordinary conditions exist that would affect traffic flows in the vicinity of the system, in which case, the Consultant may be instructed to wait until the conditions return to normal or to follow specific instructions regarding the optimization.

(a) The following tasks are associated with OPTIMIZE TRAFFIC SIGNAL SYSTEM.
   1. Appropriate signal timings and offsets shall be developed for each intersection and appropriate cycle lengths shall be developed for the closed loop signal system.

   2. Traffic counts shall be taken at all intersections after the permanent traffic signals are approved for operation by the Area Traffic Signal Operations Engineer. Manual turning movement counts shall be conducted from 6:30 a.m. to 9:30 a.m., 11:00 a.m. to 1:00 p.m., and 3:30 p.m. to 6:30 p.m. on a typical weekday from midday Monday to midday Friday. The turning movement counts shall identify cars, and single-unit and multi-unit heavy vehicles.

   3. As necessary, the intersections shall be re-addressed and all system detectors reassigned in the master controller according to the current standard of District One.

   4. A traffic responsive program shall be developed, which considers both volume and occupancy. A time-of-day program shall be developed for used as a back-up system.

   5. Proposed signal timing plan for the new or modified intersection shall be forwarded to IDOT for review prior to implementation.

   6. Consultant shall conduct on-site implementation of the timings and make fine-tuning adjustments to the timings in the field to alleviate observed adverse operating conditions and to enhance operations.

   7. Speed and delay studies shall be conducted during each of the count periods along the system corridor in the field before and after implementation of the proposed timing plans for comparative evaluations. These studies should utilize specialized electronic timing and measuring devices.

(b) The following deliverables shall be provided for OPTIMIZE TRAFFIC SIGNAL SYSTEM.
   1. Consultant shall furnish to IDOT one (1) copy of a SCAT Report for the optimized system. The SCAT Report shall include the following elements:

Cover Page in color showing a System Map
Figures 1. System overview map – showing system number, system schematic map with numbered system detectors, oversaturated movements, master location, system phone number, cycle lengths, and date of completion. 2. General location map in color – showing signal system location in the metropolitan area. 3. Detail system location map in color – showing cross street names and local controller addresses. 4. Controller sequence – showing controller phase sequence diagrams.

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Tab 2. Turning Movement Counts 1. Turning Movement Counts (Showing turning movement counts in the intersection diagram for each period, including truck percentage)
Tab 3. Synchro Analysis 1. AM: Time-Space diagram in color, followed by intersection Synchro report (Timing report) summarizing the implemented timings. 2. Midday: same as AM 3. PM: same as AM
Tab 4: Speed and Delay Studies 1. Summary of before and after runs results in two (2) tables showing travel time and delay time. 2. Plot of the before and after runs diagram for each direction and time period.
Tab 5: Electronic Files 1. Two (2) CDs for the optimized system. The CDs shall include the following elements: a. Electronic copy of the SCAT Report in PDF format b. Copies of the Synchro files for the optimized system c. Traffic counts for the optimized system d. New or updated intersection graphic display files for each of the system intersections and the system graphic display file including system detector locations and addresses.

Basis of Payment.
The work shall be paid for at the contract unit each for OPTIMIZE TRAFFIC SIGNAL SYSTEM, which price shall be payment in full for performing all work described herein for the entire traffic signal system. Following the completion of traffic counts, 25 percent of the bid price will be paid. Following the completion of the Synchro analysis, 25 percent of the bid price will be paid. Following the setup and fine tuning of the timings, the speed-delay study, and the TRP programming, 25 percent of the bid price will be paid. The remaining 25 percent will be paid when the system is working to the satisfaction of the engineer and the report and CD have been submitted.

TEMPORARY TRAFFIC SIGNAL TIMINGS

Description.
This work shall consist of developing and maintaining appropriate traffic signal timings for the specified intersection for the duration of the temporary signalized condition.

All timings and adjustments necessary for this work shall be performed by an approved Consultant who has previous experience in optimizing Closed Loop Traffic signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 705-4424 for a listing of approved Consultants.

The following tasks are associated with TEMPORARY TRAFFIC SIGNAL TIMINGS.

(a) Consultant shall attend temporary traffic signal inspection (turn-on) and conduct on-site implementation of the traffic signal timings. Make fine-turning adjustments to the timings in the field to alleviate observed adverse operating conditions and to enhance operations.

(b) Consultant shall provide monthly observation of traffic signal operations in the field.

(c) Consultant shall provide on-site consultation and adjust timings as necessary for construction stage changes, temporary traffic signal phase changes, and any other conditions affecting timing and phasing, including lane closures, detours, and other construction activities.

(d) Consultant shall make timing adjustments and prepare comment responses as directed by the Area Traffic Signal Operations Engineer.

Basis of Payment.
The work shall be paid for at the contract unit price each for TEMPORARY TRAFFIC SIGNAL TIMINGS, which price shall be payment in full for performing all work described herein per intersection. When the temporary traffic signal installation is turned on, 50 percent of the bid price will be paid. The remaining 50 percent of the bid price will be paid following the removal of the temporary traffic signal installation.

TEMPORARY TRAFFIC SIGNAL INSTALLATION.

Revise Section 890 of the Standard Specifications to read:

General.
Only an approved equipment vendor will be allowed to assemble the temporary traffic signal cabinet. Also, an approved equipment vendor shall assemble and test a temporary railroad traffic signal cabinet. (Refer to the "Inspection of Controller and Cabinet" specification). A representative of the approved control equipment vendor shall be present at the temporary traffic signal turn-on inspection.

Construction Requirements.

(a) Controllers.

1. Only controllers supplied by one of the District approved closed loop equipment manufacturers will be approved for use at temporary signal locations. All controllers used for temporary traffic signals shall be fully actuated NEMA microprocessor based with RS232 data entry ports compatible with existing monitoring software approved by IDOT District 1, installed in TS2 cabinets with 8 phase back panels, capable of supplying 255 seconds of cycle length and individual phase length settings up to 99 seconds. On projects with one lane open and two way traffic flow, such as bridge deck repairs, the temporary signal controller shall be capable of providing an adjustable all red clearance setting of up to 30 seconds in length. All controllers used for temporary traffic signals shall meet or exceed the requirements of Section 857 of the Standard Specifications with regards to internal time base coordination and preemption.

2. All control equipment for the temporary traffic signal(s) shall be furnished by the Contractor unless otherwise stated in the plans. On projects with multiple temporary traffic signal installations, all controllers shall be the same manufacturer brand and model number with current software installed.

(b) Cabinets. All temporary traffic signal cabinets shall have a closed bottom made of aluminum alloy. The bottom shall be sealed along the entire perimeter of the cabinet base to ensure a water, dust and insect-proof seal. The bottom shall provide a minimum of two (2) 4 inch (100 mm) diameter holes to run the electric cables through. The 4 inch (100 mm) diameter holes shall have a bushing installed to protect the electric cables and shall be sealed after the electric cables are installed.

(c) Grounding. Grounding shall be provided for the temporary traffic signal cabinet meeting or exceeding the applicable portions of the National Electrical Code, Section 807 of the Standard Specifications and shall meet the requirements of the District 1 Traffic Signal Specifications for “Grounding of Traffic Signal Systems”.

(d) Traffic Signal Heads. All traffic signal sections and pedestrian signal sections shall be 12 inches (300 mm). Traffic signal sections shall be LED with expandable view, unless otherwise approved by the Engineer. The temporary traffic signal heads shall be placed as indicated on the temporary traffic signal plan or as directed by the Engineer. The Contractor shall furnish enough extra cable length to relocate heads to any position on the span wire or at locations illustrated on the plans for construction staging. The temporary traffic signal shall remain in operation during all signal head relocations. Each temporary traffic signal head shall have its own cable from the controller cabinet to the signal head.

(e) Interconnect.

1. Temporary traffic signal interconnect shall be provided using fiber optic cable or wireless interconnect technology as specified in the plans. The Contractor may request, in writing, to substitute the fiber optic temporary interconnect indicated in the contract documents with a wireless interconnect. The Contractor must provide assurances that the radio device will operate properly at all times and during all construction staging. If approved for use by the Engineer, the Contractor shall submit marked-up traffic signal plans indicating locations of radios and antennas and installation details. If wireless interconnect is used, and in the opinion of the engineer, it is not viable, or if it fails during testing or operations, the Contractor shall be responsible for installing all necessary poles, fiber optic cable, and other infrastructure for providing temporary fiber optic interconnect at no cost to the contract.

2. The existing system interconnect and phone lines are to be maintained as part of the Temporary Traffic Signal Installation specified for on the plan. The interconnect shall be installed into the temporary controller cabinet as per the notes or details on the plans. All labor and equipment required to install and maintain the existing interconnect as part of the Temporary Traffic Signal Installation shall be included in the item Temporary Traffic Signal Installation. When shown in the plans, temporary traffic signal interconnect equipment shall be furnished and installed. The temporary traffic signal interconnect shall maintain interconnect communications throughout the entire signal system for the duration of the project.

3. Temporary wireless interconnect, compete. The radio interconnect system shall be compatible with Eagle or Econolite controller closed loop systems. This item shall include all materials, labor and testing to provide the completely operational closed loop system as shown on the plans. The radio interconnect system shall include the following components:

    a. Rack or Shelf Mounted RS-232 Frequency Hopping Spread Spectrum (FHSS) Radio
    b. Software for Radio Configuration (Configure Frequency and Hopping Patterns)
    c. Antennas (Omni Directional or Yagi Directional)
    d. Antenna Cables, LMR400, Low Loss. Max. 100-ft from controller cabinet to antenna
    e. Brackets, Mounting Hardware, and Accessories Required for Installation
    f. RS232 Data Cable for Connection from the radio to the local or master controller
    g. All other components required for a fully functional radio interconnect system

All controller cabinet modifications and other modifications to existing equipment that are required for the installation of the radio interconnect system components shall be included in this item.

The radio interconnect system may operate at 900Mhz (902-928) or 2.4 Ghz depending on the results of a site survey. The telemetry shall have an acceptable rate of transmission errors, time outs, etc. comparable to that of a hardwire system.

The proposed master controller and telemetry module shall be configured for use with the radio interconnect at a minimum rate of 9600 baud.

The radio interconnect system shall include all other components required for a complete and fully functional telemetry system and shall be installed in accordance to the manufacturers recommendations.

The following radio equipment is currently approved for use in Region One/District One: Encon Model 5100 and Intuicom Communicator II.

(f) Emergency Vehicle Pre-Emption. All emergency vehicle preemption equipment (light detectors, light detector amplifiers, confirmation beacons, etc.) as shown on the temporary traffic signal plans shall be provided by the Contractor. It shall be the Contractor's responsibility to contact the municipality or fire district to verify the brand of emergency vehicle preemption equipment to be installed prior to the contract bidding. The equipment must be completely compatible with all components of the equipment currently in use by the Agency. All light operated systems shall operate at a uniform rate of 14.035 hz ±0.002, or as otherwise required by the Engineer, and provide compatible operation with other light systems currently being operated in the District. All labor and material required to install and maintain the Emergency Vehicle Preemption installation shall be included in the item Temporary Traffic Signal Installation.

(g) Vehicle Detection. All temporary traffic signal installations shall have vehicular detection installed as shown on the plans or as directed by the Engineer. Pedestrian push buttons shall be provided for all pedestrian signal heads/phases as shown on the plans or as directed by the Engineer. All approaches shall have vehicular detection provided by Video Vehicle Detection System as shown on the plans or as directed by the Engineer. The microwave vehicle sensor or video vehicle detection system shall be approved by IDOT before furnishing and installing. The Contractor shall install, wire, and adjust the alignment of the microwave vehicle sensor or video vehicle detection system in accordance to the manufacturer's recommendations and requirements. The Contractor shall be responsible for adjusting the alignment of the microwave vehicle sensor or video vehicle detection system for all construction staging changes and for maintaining proper alignment throughout the project. A representative of the approved control equipment vendor shall be present and assist the contractor in setting up and maintaining the microwave vehicle sensor or video vehicle detection system. An in-cabinet video monitor shall be provided with all video vehicle detection systems and shall be included in the item Temporary Traffic Signal Installation.

(h) Signs. All existing street name and intersection regulatory signs shall be removed from existing poles and relocated to the temporary signal span wire. If new mast arm assembly and pole(s) and posts are specified for the permanent signals, the signs shall be relocated to the new equipment at no extra cost.

(i) Energy Charges. The electrical utility energy charges for the operation of the traffic signal installation shall be paid for by others if the installation replaces an existing signal. Otherwise charges shall be paid for under 109.05 of the Standard Specifications.

(j) Maintenance. Maintenance shall meet the requirements of the Traffic Specifications and District Specifications for "Maintenance of Existing Traffic Signal Installation." Maintenance of temporary signals and of the existing signals shall be included to the cost of this item. When temporary traffic signals are to be installed at locations where existing signals are presently operating, the Contractor shall be fully responsible for the maintenance of the existing signal installation as soon as he begins any physical work on the Contract or any portion thereof. Maintenance responsibility of the existing signals shall be included to the item Temporary Traffic Signal Installation(s). In addition, a minimum of seven (7) days prior to assuming maintenance of the existing traffic signal installation(s) under this Contract, the Contractor shall request that the Resident Engineer contact the Bureau of Traffic (847) 705-4424 for an inspection of the installation(s).

(k) Temporary Traffic Signals for Bridge Projects. Temporary Traffic Signals for bridge projects shall follow the State Standards, Standard Specifications, District 1 Traffic Signal Specifications and any plans for Bridge Temporary Traffic Signals included in the plans. The installation shall meet the above requirements for “Temporary Traffic Signal Installation”. In addition all electric cable shall be aerially suspended, at a minimum height of 18 feet (5.5m), on temporary wood poles (Class 5 or better) of 45 feet (13.7 m), minimum height. The signal heads shall be span wire mounted or bracket mounted to the wood pole or as directed by the Engineer. The Controller cabinet shall be mounted to the wood pole or as directed by the Engineer. Microwave vehicle sensors or video vehicle detection may be used in place of the detector loops as approved by the Engineer.

(l) Temporary Portable Traffic Signal for Bridge Projects.

1. Unless otherwise directed by the Engineer, temporary portable traffic signals shall be restricted to use on roadways of less than 8000 ADT that have limited access to electric utility service, shall not be installed on projects where the estimated need exceeds ten (10) weeks, and shall not be in operation during the period of November through March. The Contractor shall replace the temporary portable traffic signals with temporary span wire traffic signals noted herein at no cost to the contract if the bridge project or Engineer requires temporary traffic signals to remain in operation into any part of period of November through March. If, in the opinion of the engineer, the reliability and safety of the temporary portable traffic signal is not similar to that of a temporary span wire traffic signal installation, the Contractor shall replace the temporary portable traffic signals with temporary span wire traffic signals noted herein at no cost to the contract.

2. The controller and LED signal displays shall meet the above requirements for “Temporary Traffic Signal Installation”.

3. Work shall be according to Article 701.18(b) of the Standard Specifications except as noted herein.

4. General.

    a. The temporary portable bridge traffic signals shall be trailer-mounted units. The trailer-mounted units shall be set up securely and level. Each unit shall be self-contained and consist of two signal heads. The left signal head shall be mounted on a mast arm capable of extending over the travel lane. Each unit shall contain a solar cell system to facilitate battery charging. There shall be a minimum of 12 days backup reserve battery supply and the units shall be capable of operating with a 120 V power supply from a generator or electrical service.

    b. All signal heads located over the travel lane shall be mounted at a minimum height of 17 feet (5m) from the bottom of the signal back plate to the top of the

road surface. All far right signal heads located outside the travel lane shall be mounted at a minimum height of 8 feet (2.5m) from the bottom of the signal back plate to the top of the adjacent travel lane surface.

c. The long all red intervals for the traffic signal controller shall be adjustable up to 250 seconds in one-second increments.

d. As an alternative to detector loops, temporary portable bridge traffic signals may be equipped with microwave sensors or other approved methods of vehicle detection and traffic actuation.

e. All portable traffic signal units shall be interconnected using hardwire communication cable. Radio communication equipment may be used only with the approval of the Engineer. If radio communication is used, a site analysis shall be completed to ensure that there is no interference present that would affect the traffic signal operation. The radio equipment shall meet all applicable FCC requirements.

f. The temporary portable bridge traffic signal system shall meet the physical display and operational requirements of conventional traffic signals as specified in Part IV of the Manual on Uniform Traffic Control Devices (MUTCD). The signal system shall be designed to continuously operate over an ambient temperature range between -30 ºF (-34 ºC) and 120 ºF (48 ºC). When not being utilized to inform and direct traffic, portable signals shall be treated as nonoperating equipment according to Article 701.11.

g. Basis of Payment. This work will be paid for according to Article 701.20(c).

Basis of Payment.
This work shall be paid for at the contract unit price each for TEMPORARY TRAFFIC SIGNAL INSTALLATION, TEMPORARY BRIDGE TRAFFIC SIGNAL INSTALLATION, or TEMPORARY PORTABLE BRIDGE TRAFFIC SIGNAL INSTALLATION. The price of which shall include all costs for the modifications required for traffic staging, changes in signal phasing as required in the Contract plans, microwave vehicle sensors, video vehicle detection system, any maintenance or adjustment to the microwave vehicle sensors/video vehicle detection system, all material required, the installation and complete removal of the temporary traffic signal.

REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT.

Add the following to Section 895.05 of the Standard Specifications:

The traffic signal equipment, which is to be removed and is to become the property of the Contractor shall be disposed of by them outside the right-of-way at their expense.

All equipment to be returned to the County shall be delivered by the Contractor to the County's Traffic Signal Maintenance Contractor's main facility. The Contractor shall contact the County's Electrical Maintenance Contractor to schedule an appointment to deliver the equipment. No equipment will be accepted without a prior appointment. All equipment shall be delivered within 30 days of removing it from the traffic signal installation. The Contractor shall provide 5 copies of a list of equipment that is to remain the property of the State, including model and serial numbers, where applicable. He shall also provide a copy of the Contract plan or special provision showing the quantities and type of equipment. Controllers and peripheral equipment from the same location shall be boxed together (equipment from different locations may not be mixed) and all boxes and controller cabinets shall be clearly marked or labeled with the location from which they were removed. If equipment is not returned with these requirements, it will be rejected by the County's Electrical Maintenance Contractor. The Contractor shall be responsible for the condition of the traffic signal equipment from the time he takes maintenance of the signal installation until

the acceptance of a receipt drawn by the County's Electrical Maintenance Contractor indicating the items have been returned in good condition.

The Contractor shall safely store and arrange for pick up of all equipment to be returned to agencies other than the State. The Contractor shall package the equipment and provide all necessary documentation as stated above.

Traffic signal equipment, which is lost or not returned to the Department for any reason shall be replaced with new equipment meeting the requirements of these Specifications.

TRAFFIC SIGNAL PAINTING.

Description.
This work shall include surface preparation, powder type painted finish application and packaging of new galvanized steel traffic signal mast arm poles and posts assemblies. All work associated with applying the painted finish shall be performed at the manufacturing facility for the pole assembly or post or at a painting facility approved by the Engineer. Traffic signal mast arm shrouds and post bases shall also be painted the same color as the pole assemblies and posts.

Surface Preparation.
All weld flux and other contaminates shall be mechanically removed. The traffic mast arms and post assemblies shall be degreased, cleaned, and air dried to assure all moisture is removed.

Painted Finish.
All galvanized exterior surfaces shall be coated with a urethane or triglycidyl isocyanurate (TGIC) polyester powder to a dry film thickness of 2.0 mils. Prior to application, the surface shall be mechanically etched by brush blasting (Ref. SSPC-SP7) and the zinc coated substrate preheated to 450 degrees F for a minimum one (1) hour. The coating shall be electrostatically applied and cured by elevating the zinc-coated substrate temperature to a minimum of 400 degrees F.
The finish paint color shall be one of the manufacturer's standard colors and shall be as selected by the local agency responsible for paint costs. The Contractor shall confirm, in writing, the color selection with the local responsible agency and provide a copy of the approval to the Engineer and a copy of the approval shall be included in the material catalog submittal.

Traffic signal heads, pedestrian signal heads and controller cabinets are not included in this pay item.

Any damage to the finish after leaving the manufacturer's facility shall be repaired to the satisfaction of the Engineer using a method approvable by the Engineer and manufacturer. If while at the manufacturer's facility the finish is damaged, the finish shall be re-applied.

Warranty.
The Contractor shall furnish in writing to the Engineer, the paint manufacturer's standard warranty and certification that the paint system has been properly applied.

Packaging.
Prior to shipping, the poles and posts shall be wrapped in ultraviolet-inhibiting plastic foam or rubberized foam.

Basis of Payment.
This work shall be paid for at the contract unit price each for PAINT NEW MAST ARM POLE, UNDER 40 FEET (12.19 METER); PAINT NEW MAST ARM POLE, 40 FEET (12.19 METER) AND OVER; PAINT NEW COMBINATION MAST ARM POLE, UNDER 40 FEET (12.19 METER); PAINT NEW COMBINATION MAST ARM POLE, 40 FEET (12.19 METER) AND OVER; or TRAFFIC SIGNAL POST of any height, which shall be payment in full for painting and packaging the traffic signal mast arm poles and posts described above including all shrouds, bases and appurtenances.

DIVISION 1000 MATERIALS

PEDESTRIAN PUSH-BUTTON.

Add the following to Section 1074.02 (b) and (d) of the Standard Specifications to read:

(a) General. Push-button assemblies shall be ADA compliant, highly vandal resistant, be pressure activated with minimal movement and cannot be stuck in a closed or constant call position. A red LED and audible tone shall be provided for confirmation of an actuation call.
(b) Housing. The push-button housing shall be solid 6061 aluminum and powder coated yellow, unless otherwise noted on the plans.
(c) Actuator. The actuator shall be stainless steel with a solid state electronic Piezo switch rated for a minimum of 20 million cycles with no moving plunger or moving electrical contacts. The operating voltage shall be 12-24 V AC/DC.
(d) Pedestrian Station. Stations shall be designed to be mounted directly to a post, mast arm pole or wood pole. The station shall be aluminum and accept a 3-inch round push button assembly and 5 X 7 ¾ -inch R10-3b or R10-3d sign. A larger station will be necessary to accommodate the sign, R10-3e, for a count-down pedestrian signal.

The McHenry County Division of Transportation accepts the following pedestrian push buttons:

- Campbell Company Pedestrian Buttons, model 4 EVR 120 yellow aluminum bezel and stainless steel plunger. TS2 Compliant: minimum 120 ms signal duration. Button to have LED light and audible tone.
- Polara Engineering Bulldog Pedestrian Pushbuttons, model BDLL2-Y yellow aluminum bezel and stainless steel plunger. TS2 Compliant: minimum 120 ms signal duration. Button to have LED light and audible tone.

CONTROLLER CABINET AND PERIPHERAL EQUIPMENT.

Revise Section 1074.03 of the Standard Specifications to read:

Add the following to Article 1074.03 of the Standard Specifications:

(a) Cabinets shall be designed for NEMA TS2 Type 1 operation. All cabinets shall be pre-wired for a minimum of eight (8) phases of vehicular, four (4) phases of pedestrian and four (4) phases of overlap operation.

(b)(5) Cabinets – Provide 1/8" (3.2 mm) thick unpainted aluminum alloy 5052-H32. The surface shall be smooth, free of marks and scratches. All external hardware shall be stainless steel.
(b) (6) Controller Harness – Provide a TS2 Type 2 “A” wired harness in addition to the TS2 Type 1 harness.
(b) (7) Surge Protection – ASC Zone IT (50 kA rating) with LED status indicators. Model 91391 Zone IT base station and Model 91375 Zone IT or equivalent ASC model.
(b) (8) BIU – Containment screw required.
(b) (9) Transfer Relays – Solid state or mechanical flash relays are acceptable.
(b) (10) Switch Guards – All switches shall be guarded.
(b) (11) Heating – Electric heaters (2 total), Hoffman model DAH2001A or equivalent located in lower left and upper right corners of cabinet, controlled by both a wall switch and a thermostat.
(b) (12) Plan & Wiring Diagrams – 12” x 16” (3.05mm x 4.06mm) moisture sealed container attached to door.

(b) (13) Detector Racks – Fully wired and labeled for four (4) channels of emergency vehicle pre-emption and sixteen channels (16) of vehicular operation.
(b) (14) Field Wiring Labels – All field wiring shall be labeled.
(b) (15) Field Wiring Termination – Approved channel lugs required.
(b) (16) Power Panel – Provide a nonconductive shield.
(b) (17) Circuit Breaker – The circuit breaker shall be sized for the proposed load but shall not be rated less than 30 amps.
(b) (18) Police Door – Provide wiring and termination for plug in manual phase advance switch.
(b) (19) Railroad Pre-Emption Test Switch – Eaton 8830K13 SHA 1250 or equivalent.
(b) (20) Malfunction Management Unit (MMU) – The MMU supplied shall have a Liquid Crystal Display (LCD) and also have an Ethernet communications port.
(b) (21) Load Switch – All load switches shall have both input and output LED controller status indicators.

RAILROAD, FULL-ACTUATED CONTROLLER AND CABINET.

Add the following to Article 857.02 of the Standard Specifications:

Controller shall comply with Article 1073.01 as amended in these Traffic Signal Special Provisions.

Controller Cabinet and Peripheral Equipment shall comply with Article 1074.03 as amended in these Traffic Signal Special Provisions.

Add the following to Articles 1073.01 (c) (2) and 1074.03 (a) (5) (e) of the Standard Specifications:

Controllers and cabinets shall be new and NEMA TS2 Type 1 design.

A method of monitoring and/or providing redundancy to the railroad preemptor input to the controller shall be included as a component of the Railroad, Full Actuated Controller and Cabinet installation and be verified by the traffic signal equipment supplier prior to installation.

Railroad interconnected controllers and cabinets shall be assembled only by an approved traffic signal equipment supplier. The equipment shall be tested and approved in the equipment supplier's District One facility prior to field installation.

ELECTRIC CABLE.

Delete "or stranded, and No. 12 or" from the last sentence of Section 1076.04 (a) of the Standard Specifications.

MAST ARM ASSEMBLY AND POLE.

Add the following to Section 1077.03 (a) of the Standard Specifications:

Traffic signal mast arms shall be one piece construction, unless otherwise approved by the Engineer. All poles shall be galvanized. If the Department approves painting, powder coating by the manufacturer will be required over the galvanization.

This work shall consist of furnishing and installing a galvanized steel or extruded aluminum shroud for protection of the mast arm pole base plate similar to the dimensions detailed in the "District 1 Standard Traffic Signal Design Details." The shroud shall be of sufficient strength to deter pedestrian and vehicular damage. The shroud shall allow air to circulate throughout the mast arm but not allow manifestation of insects or critters. The shroud shall be constructed, installed and designed not to be hazardous to probing fingers and feet. All mounting hardware shall be stainless steel. The shroud shall not be paid for separately but shall be included in the cost of the mast arm assembly and pole.

TRAFFIC SIGNAL POST.

Add the following to Section 1077.03 (b) of the Standard Specifications:

All posts and bases shall be steel and hot dipped galvanized. If the Department approves painting, powder coating by the manufacturer will be required over the galvanization.

SIGNAL HEADS.

Add the following to Section 1078 of the Standard Specifications to read:

All signal and pedestrian heads shall provide 12" (300 mm) displays with glossy yellow polycarbonate housings. All head housings shall be the same color (yellow) at the intersection. For new signalized intersections and existing signalized intersections where all signal and/or pedestrian heads are being replaced, the proposed head housings shall be yellow. Where only selected heads are being replaced, the proposed head housing color (yellow) shall match existing head housings. Connecting hardware and mounting brackets shall be polycarbonate (black). A corrosive resistant anti-seize lubricant shall be applied to all metallic mounting bracket joints, and shall be visible to the inspector at the signal turn-on. Post top mounting collars are required on all posts, and shall be constructed of the same material as the brackets.

Pedestrian signal heads shall be furnished with the international symbolic "Walking Person" and "Upraised Palm" lenses. Egg crate sun shields are not permitted.

Signal heads shall be positioned according to the "District 1 Standard Traffic Signal Design Details."

SIGNAL HEAD, BACKPLATE.

Delete 1st sentence of 1078.03 of the Standard Specifications and add "All backplates shall be aluminum and louvered."

INDUCTIVE LOOP DETECTOR.

Add the following to Section 1079.01 of the Standard Specifications:

Contracts requiring new cabinets shall provide for card mounted detector amplifiers. Loop amplifiers shall provide LCD displays with loop frequency, inductance, and change of inductance readings.

ILLUMINATED SIGN, LIGHT EMITTING DIODE.

Revise Sections 891 of the Standard Specifications to read:

Description.
This work shall consist of furnishing and installing an illuminated sign with light emitting diodes.

General.
The light emitting diode (LED) blank out signs shall be manufactured by National Sign & Signal Company, or an approved equal and consist of a weatherproof housing and door, LEDs and transformers.

(a) Display.
   1. The LED blank out sign shall provide the correct symbol and color for "NO LEFT TURN" OR "NO RIGHT TURN" indicated in accordance with the requirements of the "Manual on Uniform Traffic Control Devices". The message shall be formed by rows of LEDs.

   2. The message shall be clearly legible. The message shall be highly visible, anywhere and under any lighting conditions, within a 15 degree cone centered about the optic axis.

The sign face shall be 24 inches (600 mm) by 24 inches (600 mm). The sign face shall be completely illegible when not illuminated. No symbol shall be seen under any ambient light condition when not illuminated.

3. All LEDs shall be T-1 3/4 (5mm) and have an expected lamplife of 100,000 hours. Operating wavelengths will be Red-626nm, Amber-590nm, and Bluish/Green-505nm. Transformers shall be rated for the line voltage with Class A insulation and weatherproofing. The sign shall be designed for operation over a range of temperatures from –35F to +165 F (-37C to +75C).

4. The LED module shall include the message plate, high intensity LEDs and LED drive electronics. Door panels shall be flat black and electrical connections shall be made via barrier-type terminal strip. All fasteners and hardware shall be corrosion resistant stainless steel.

(b) Housing.

1. The housing shall be constructed of extruded aluminum. All corners and seams shall be heli-arc welded to provide a weatherproof seal around the entire case. Hinges shall be continuous full-length stainless steel. Signs shall have stainless steel hardware and provide tool free access to the interior of the sign. Doors shall be 0.125-inch thick extruded aluminum with a 3/16-inch x 1-inch neoprene gasket and sun hood. The sign face shall have a polycarbonate, matte clear, lexan face plate. Drainage shall be provided by four drain holes at the corners of the housing. The finish on the sign housing shall include two coats of exterior enamel applied after the surface is acid-etched and primed with zinc-chromate primer.

2. Mounting hardware shall be black polycarbonate or galvanized steel and similar to mounting Signal Head hardware and brackets specified herein.

Basis of Payment.
This work shall be paid for at the unit price each for ILLUMINATED SIGN, L.E.D.

UNIT DUCT.

All installations of Unit Duct shall be incidental to the contract and not paid for separately. Polyethylene unit duct shall be used for detector loop raceways to the handholes. On temporary traffic signal installations with detector loops, polyethylene unit duct shall be used for detector loop raceways from the saw-cut to (3 m) 10’ up the wood pole, unless otherwise shown on the plans. Unit duct shall meet the requirements of NEC Article 343.

UNINTERRUPTIBLE POWER SUPPLY (UPS)

NOTE: The McHenry County Division of Transportation currently accepts TechPower DBL series 700 Watt UPS equipment with MK Battery Company sealed batteries (79 amp-hour) (a total of 6 batteries required).

DBL SERIES DOUBLE CONVERSION UPS

Overview

The DBL SERIES Traffic UPS is a true on-line regenerative uninterruptible power system designed for transportation and traffic applications. The DBL Series is capable of operating at its maximum rated output in extreme and harsh environments with all existing equipment. The rated continuous minimum

output shall be 700, 1400, 1500, & 2100 watts. It is designed to operate continuously On-Line from any AC utility source or generator.

Operation:

1. The DBL Series UPS system shall be capable of producing a fully regenerated, conditioned, pure sine wave AC. The online operational-mode, shall be continuous to all loads. It shall incorporate a high frequency Pulse-Width Modulated technology and shall use an input rectifier, charger, battery and inverter in a single board configuration. The DBL double conversion UPS shall provide a clean, pure AC sine-wave output at all times with a voltage input variation of 85VAC to 145VAC while providing 120VAC to the connected load at all times. The DBL shall be capable of operating in the voltage range of 85VAC to 135VAC without using the batteries and always provide a regulated output to the protected loads.

2. The Input rectifier shall be rated at 23 times the output rating of the inverter.

3. The Inverter circuit shall be in continuous operation at all times (constant duty). The inverter shall be rated for 100% duty cycle and simultaneously fed from the rectifier and battery to eliminate any switching to battery or transitions during power fluctuations or power interruption. The inverter's output shall be pure clean sine wave with an efficiency of up to 85%.

4. The constant duty operation shall be rated in Total watts. This will enable the traffic DBL UPS to support any combination of signal heads whether Incandescent, LED or Neon, by any manufacturer, regardless of powerfactor.

5. The DBL shall be capable of operating from a generator source without the need for over-sizing the UPS system. During operation from a generator source, the DBL shall operate in a normal fashion and provide filtered and regulated power with or without automatic input/output frequency synchronization. Upon excessive generator frequency drift, the DBL shall compensate through regeneration and supplying both continuous frequency and voltage regulation to the protected load.

6. The DBL UPS shall be capable of glitch ride through capabilities and provide a seamless output to the connected load during this anomaly without the use of the batteries.

7. The DBL UPS shall be capable of providing an overload output rating of 120% for 60 seconds, 150% for 10 seconds to any combinations of signal types whether Incandescent, LED or Neon during inrush or overload conditions.

8. The DBL shall have an internal static bypass that will transfer to line power if over load exceeds 150% for more than 5 sec. This bypass will maintain the load until this overload has cleared.

9. The DBL UPS shall have a separate Neutral detecting circuit that shall monitor loss of utility neutral and completely disconnect any input source to the UPS system.

10. The DBL UPS shall have an input back feed relay operating in series with the Neutral monitoring circuit.

11. Upon loss of utility power, the DBL UPS inverter shall continue to provide seamless pure sine-wave AC from the batteries without switching, transfer or changing its' operating status. The DBL will use the battery mode in `0' ms. This will insure that the DBL provides pure sine wave power under all conditions, at all times without interruption.

12. The DBL UPS will continue to provide generated AC from the inverter until the batteries are

depleted.

13. When the batteries have been depleted, the DBP UPS will ensure upon the return of Utility Power that the UPS will restart automatically and provide regenerated AC to the protected equipment and allow the equipment to resume normal operation.

14. The DBL shall be capable of operating in a full regenerated, power-conditioning mode with depleted batteries or failed batteries. The regenerative power conditioning will ensure that there will be regulated and conditioned pure AC power to the equipment. This regenerative mode will provide extended brown-output protection with wide input line regulation, noise filtering and surge protection.

15. The DBL UPS shall operate in an uninterruptible regenerative on-line mode during flash or normal signal operation.

16. The DBL shall be rated at Unity Power Factor. The output VA and Watts rating shall be equal on the output at all times.

17. The DBL shall be capable of COLD starting without AC present and provide AC power to the load.

18. The DBL UPS shall be capable of self diagnostics during start up or with the use of the front panel TEST button.

19. The DBL UPS case shall be constructed from .064 aluminum and carbon steel.

20. The DBL input and output connections shall be Anderson Power Pole quick lock connector to eliminate exposed terminals or connections.

21. The DBL UPS to bypass interconnect harness shall be reversible with matching Anderson Power connectors that will prevent risk of shock, or damage to the connected equipment.

22. The DBL shall be capable of Hot-Swapping the batteries or battery bank, without shutting down the DBL UPS

23. The DBL shall be capable of being Hot-Swapped during normal operation when used with the external Hot Swap Bypass. The UPS may also be shut-off with the Hot Swap Bypass in place without loss of AC to the loads.

24. The DBL shall be capable or providing a replaceable relay card with relay output contacts for AC fail, Inverter ON, Low Battery, Battery Fail, Bypass and Alarms.

25. The DBL relay card may be replaced with an SNMP card for SNMP communications and information.

26. The DBL UPS shall provide a programmable Dry Relay output for flash.

27. The contacts shall be provided in N/O and N/C positions. The delay timer shall be a maximum of 10 hours

28. The timer shall be front panel mounted.

29. The Timer dial shall be 4.7 inches in circumference.

    - The timer shall have a scale in increments of 1s to lOseconds. This scale can be changed to indicate 1 minute, to 10 minutes or a maximum scale of 1 hour to 10

hours.

- The scale shall be controlled by two (2) separate dip switches on the timer face.
- The timer shall indicate using a flashing RED LED that the timing function is operating.
- The timer shall use a steady RED LED to indicate that the timing is now completed
- The timer shall count in a down mode to `0' from the preset time indicated on the scale.

30. The LED indicators shall provide status for AC line, UPS Battery Mode, Charging, Low Battery, Fault, Bypass, Percentage of Load and Battery Charge.

31. The Event counter and Hour meter may be rest to `0' using separated buttons.

32. The DBL shall have a battery charger rated at 200 watts @ 36VDC with an optional of 400 watts.

33. The DBL 1400 shall have a battery charger rated @ 200 watts @ 72VDC with an optional 500 watts and 1000 watts.

34. The DBL 2100 shall have a battery charger rated at 96VDC @ 200 watts.

35. This charger shall be completely separate from the rectifier/inverter included with the main DBL board.

36. The DBL chargers may be used in a parallel configuration for increased charger ratings.

37. The DBL uses a redundant internal 1 amp charger that will continue to charger the batteries if the separate board charger fails.

38. The DBL UPS maybe used with redundancy in mind with the use of the Dual Hot Swap Option. That will provide a secondary UPS source in less than 20ms. The Secondary UPS may be connected to the alternate input of the Hot Swap Bypass

39. The Flash programming shall be a simple and field programmable without the use an external connected device such as a laptop or computer.

40. The Hot swap Bypass shall allow the UPS to be removed or installed at any time during normal load operation.

41. The UPS shall include standard graphical real time software and connection cable.

1.0 Description:

- The DBL shall consist of 3 major components. The Main board rectifier/inverter, charger and control board.

- The Main Board shall consist of a True-Sine-Wave constant duty high frequency inverter utilizing High-Frequency Pulse-Width Modulated technology.

- The Input Rectifier, is rated for the total wattage output rating of the UPS including the 150% overload and the charger rating. The inverter shall be a high efficiency constant duty design with and efficiency of 83%. The inverter includes its own static

bypass which provides an alternate AC path during overload and or Inverter alarm conditions.

- The heat-sink shall be a continuous aluminum extrusion design with plenum directed airflow cooling. The 12VDC dual stage cooling fans shall be variable speed controlled by the logic board.

- The charger portion is a 3 stage Hysterisis 0.5 amp, 36 or 72VDC charger with temperature compensation. The supplementary charger is a parallel design rated for 200, 500 and 1000 watts.

- The Electronic Control board monitors the Rectifier and Inverter functions. It provides the overall control of all the UPS functions and or operational capabilities.

2.0 Mounting Configuration

- Shelf mounting, or rack mounting. Shelves, cabinets supplied by others.
  170 style mounting method shall be 19" rack mount. Rack, angles or rails supplied by others External: A separate stand alone NEMA Traffic cabinet may be supplied.
- Rack mounting ears shall be removable. 4 additional rubber feet are installed for shelf mounting.

3.0 Battery System

- The batteries shall be comprised of First Power High Temperature deep cycle (45, 55 and 100AH) batteries which have been proven under extreme temperature conditions.

- The battery system or configurations shall consist of one or more strings. Each string shall be 36, 72 or 96 Vdc. The batteries shall be provided with the appropriate interconnect cables

- The battery cables shall have a minimum conductor size rating of #10.

- The battery cable shall consist of a quick release Anderson connector rated at 25 amps, for the purpose of safety the connector shall have recessed pins and keyed interlock to prevent reversal of connection or separation.

- Battery construction shall be polycarbonate high temperature design. High pure lead content with internal resistance of.0028 ohms, Poly -case high impact construction, to with stand high vibration and shock. The connections shall be of stainless steel 3/8 stud with 3/8 stainless nut and locking washer Removable lifting handle shall be standard.

4.0 Electrical Specifications

Design:	Double Conversion true on line.
Nominal Input:	110, 115 & 120v AC single phase dip switch selectable.
Input Voltage Range:	80v to 140v AC
Input Frequency:	50/60hz (47 to 63)
Efficiency:	83 %
Input Configuration:	3 wire with ground
Input Protection:	15 amp re-settable breaker (on DBL 700)

Input Current:	10.4 amps (includes charger) (on DBL 700)
Power Rating Continuous:	700 watts, 1400watts, 2100 watts
Output Current:	@ 700 watts 5.8 amps, 11.6 @1400, 17.7 @ 2100
Output Regulation	+/- 3% with 100% resistive load
Output Regulation w/ low battery:	+/- 3% with 100% resistive load
Output Voltage:	I20v AC
Output Wave Form:	Pure sine wave
Harmonic Distortion:	3% Linear Load, 5% Non Linear Load
Dynamic Response:	+/- 5% RMS for 100% step load change, 1.0 ms recovery time
Overload Capability:	120% for 60 sec, 150% watts for 10 sec
Charger:	200 watt 36VDC DBL 700, 72VDC on DBL 1400, Parallel 400, 1000 and 2000 watt
Surge:	ANSI-C62.41
Fault Clearing:	Current Limit and automatic to bypass
Short Circuit Protection:	Output Breaker / Fuse, then shut down
Load Power Factor:	6 leading to .6 lagging
Output Connection:	Anderson Power Pole Connector 6 pin keyed.
DC Connection:	Anderson 50 amp Keyed Recessed connector
Recognition:	UL Recognized & IEE 587 / C62.41 on main UPS board

5.0 Mechanical

Dimensions
6.00 H x 10.5 D x 15.15 W (DBL 700) 5.27H x 12.5D x 17.15W (DBL 1400) 7H x 12D x 17.15W(DBL 2100) Weight: unit only 18lbs, 28 & 49
Construction: 0.064 Carbon steel and Aluminum Case
Coating: Powder coating, with a minimum of 1.5mil of thickness.

6.0 Environmental

The DBL shall meet or exceed NEMA temperature standards from -40c to + 74c

7.0 Communications Control & **Diagnostics**

LED indicators for: Line monitoring, Battery Mode, Charging, Low Battery, Fault I
Bypass Load level, Battery Level. Ground Fault.
Manual test function.
Alarm Function: Audible, Low Battery, Battery Fail, Bypass, Overload.
RS 232 port supplied with communication software. For real time UPS operational status. USB ready.

Relay Card:

1. Bypass ON
2. AC fail or out of tolerance.
3. AC normal or in tolerance.
4. Inverter is operating (ON)
5. Battery low
6. Battery failed or bad
7. UPS general alarm
8. Ground (logic)
9. Apply 6 to +25VDC
10. Between pin 9 and 10, will shut the UPF down

8.0 Reliability

Calculated MTBF is 120,000 hours based on component ratings When Bypass is installed, system MTBF increases to 160,000 hrs

10.0 Hot Swap Bypass Switch

Bypass Rating:	30 amp maximum
Bypass Transfer:	Automatically to line in 20ms, “0” crossing at full load
Control:	Rocker On/Off switch indicating `Auto' and Bypass
Relays:	AC internal Load relay at `Zero Crossing' with parallel function DC relay for interlocking and protection, Failsafe mode to N/C for AC power direct to load when failure occurs or in Bypass position.
Protection:	Internal Snubber circuit for spike attenuation during transfer at `Zero' crossing, Internal fuse.
Connections:	Flush mounted Anderson Power connector. With locked and keyed.
Indicators:	LED for Line Available, Bypass, Ups On Line, UPS Available
Dimensions:	7.5 x 5 x 2.5
Weight:	14 lbs

9.0 Options

- SNMPIWEB monitoring.
- 24/7 Adjustable perpetual timer.
- Parallel operation for redundancy
- Charger capacity up to 30 amps for long back up times and quick recharge.
- Hot Swap Bypass With alternate input option with monitoring circuitry for second input.
- Rack-Mount Hot swap Bypass Switch.

H) SNMP

Supports TCP/IP, UDP, SNMP. HTTP protocol, This provides the user with SNMP MIB for UPS monitoring and UPS status. Remotely provides UPS real time information including Data logging and UPS status in Real Time. Allow the identification and monitoring of an unlimited number of UPS systems.
Each system has its' own identification. The system will send warning messages to the user if the UPS status has changed. Use Internet Explorer for Remote Viewing.

1) UPS load
2) Battery Charger status
3) UPS operation Normal/Alarm
4) Input Voltage
5) Output Voltage
6) Battery Voltage
7) UPS Temperature
8) UPS information logging
9) Remote UPS battery testing.
10) Send output email if UPS status has changed
11) Built in reset with panel mounted led indicators for SNMP status.

LED(1) Green LED: Status receiving
Yellow: Data Transmitting

LED(2) Green: SNMP connecting

Yellow: SNMP functioning

BROWSING Internet Explorer.

1) UPS monitoring
2) UPS Information
3) UPS Control

Can be used to remotely service and test the UPS batteries.

Logging:

Date, Time, Voltage, Load, Temp, Alarm, Battery Status.

(I) TIMER 24/7

The timer is internally mounted in the UPS. It includes a DB9 connector. This provides the connection and programming to the timer.
This timer is completely programmable to any number of flash delays related to the time of day. It allows the complete flexibility of flash delay or skipping the flash during that particular event related to traffic flow and even holidays,

1) 7 days 24Hrs Flash delay timing.
2) Perpetual Clock.
3) Maximum of 31 settings per day.
4) Timing resolution to the minute.
5) 4 Possible commands per event.
6) Serial Port for schedule entry and editing.
7) Real-time operation, editing functions will not interrupt the units functions.
8) J-Tag port for instant preload of complete 7-day schedule file.
9) SPDT 10 amp 240VAC /24VDC ratings.
10) Input Voltage 110 to 240VAC or 24VDC unregulated supply..
11) Plus! Capable of scheduling for holidays or specific year/dates.
12) Capable of operating at 2400 baud micro-modem for direct phone connection
13) Capable of operating at 1200 to 230,000 baud rate on a serial port.
14) Capable of log retention.
15) OPTIONAL LED DISPLAY

Logging Display Timer Option.

1) The Logging option shall provide a continuous scroll logging function when included. This log function shall scroll and maintain 1500 individual log entries with date stamp based on a perpetual clock.

(J) 500 and 1000 watt charger

- Generator Input option on Bypass.

- Rack mount Bypass, with small form factor.
- Extended battery options.
- Parallel /Redundant for redundancy. (please call for application)

10.0 Warranty

Standard (2) two year on all components excluding batteries parts and labor, FOB Factory or Authorized Repair Depot

11.0 Batteries

There shall be 6 batteries supplied with this UPS system.
Batteries shall be AGM flat plate high rate, high temperature design.

Nominal voltage: 12VDC
Capacity@ 25C: 79AH
Approx weight: 13.5Kg
Internal Resistance: 9.5 mOhms

Dimensions: 197mm x 165mm x 170mm (7.76 x 6.50 x 6.69)

Capacity (10hr rate) 75c -- 112%
65c -- 108%
55c -- 105%
25c -- 100%
0c -- 85%
-15c -- 65%

Self Discharge: 3 months 91% capacity remaining
6 months 82% capacity remaining
12 months 65% capacity remaining

Operating Temperature: -15c to +75C

Float Voltage: 13.50 to 13.80
Cyclic charging voltage: 14.50 to 14.90
Maximum charge current: 12A
Terminal material: Copper
Maximum discharge current: 400A (5 sec)
This specification sets forth the minimum requirements for an uninterruptible power system with battery back-up, for a traffic signal. The system is comprised of the UPS or Inverter unit, bypass switch, batteries, cabinet, and related wiring harnesses.

12.0 Cabinet

The cabinet shall be a California Chassis aluminum cabinet, Part Number FCU104013, with a natural aluminum mill finish, or approved equal.

The external cabinet dimensions shall be 41 inches tall by 25 inches wide by 16 inches deep, excluding the door. The cabinet shall house all batteries, the UPS, the Bypass Switch, and the wiring harnesses.

When installed, the cabinet for the UPS shall rest on the traffic signal cabinet foundation and shall also be secured to the right side of the traffic signal cabinet.

A blue LED indicator light shall be mounted on the side of the UPS cabinet facing traffic and shall turn on to indicate when cabinet power has been disrupted and the UPS is in operation. The light shall be a minimum of 1" in diameter, be viewable from the driving lanes, and shall be large enough and visible enough to be seen from 200 feet away.

The cabinet shall provide an external connection for an AC generator to power the signals, if necessary, during an extended utility power outage. The external connection shall be a NEMA Style 5-15 male flanged receptacle. A police door shall provided in the upper half of the main door end encompasses the full area of the outlet panel. This shall be location of the outlet to supply an external connection for an AC generator listed above. The standard dimensions of the panel are 7½" high, 12" wide and 2½" deep and are located directly behind the police door. A skeleton lock by Corbin is furnished for the police door unless otherwise specified.

Basis of Payment: This item shall be paid for at the contract unit price, each, for furnishing and installing the UNINTERRUPTIBLE POWER SUPPLY (UPS). The price shall include the UPS/Inverter unit, Bypass Switch, Batteries (six, according to the plans), Cabinet, wiring harnesses, and all associated equipment and materials necessary for proper operation.

SIGNAL HEAD, LIGHT EMITTING DIODE.

Description.
This work shall consist of furnishing and installing a traffic signal head or pedestrian signal head with light emitting diodes (LED) of the type specified in the plan or retrofitting an existing traffic signal head with a traffic signal module or pedestrian signal module with LEDs as specified in the plans.

General.
LED signal heads (All Face and Section Quantities), (All Mounting Types) shall conform fully to the requirements of Sections 880 and 881 and Articles 1078.01 and 1078.02 of the "Standard Specifications for Road and Bridge Construction," adopted January 1, 2007, and amended herein:

1. The LED signal modules shall be replaced or repaired if an LED signal module fails to function as intended due to workmanship or material defects within the first 60 months from the date of delivery. LED signal modules which exhibit luminous intensities less than the minimum values specified in Table 1 of the ITE Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement (June 27, 2005) [VTSCH] or show signs of entrance of moisture or contaminants within the first 60 months of the date of delivery shall be replaced or repaired. The manufacturer's written warranty for the LED signal modules shall be dated, signed by an Officer of the company and included in the product submittal to the State.

2. Each module shall consist of an assembly that utilizes LEDs as the light source in lieu of an incandescent lamp for use in traffic signal sections.

(a) Physical and Mechanical Requirements

1. Modules can be manufactured under this specification for the following faces:

   a. 12 inch (300 mm) circular, multi-section
   b. 12 inch (300 mm) arrow, multi-section
   c. 12 inch (300 mm) pedestrian, 2 sections

2. The maximum weight of a module shall be 4 lbs. (1.8 kg).

3. Each module shall be a sealed unit to include all parts necessary for operation (a printed circuit board, power supply, a lens and gasket, etc.), and shall be weather proof after installation and connection.

4. Material used for the lens and signal module construction shall conform to ASTM specifications for the materials.

5. The lens of the module shall be tinted with a wavelength-matched color to reduce sun phantom effect and enhance on/off contrast. The tinting shall be uniform across the lens face. Polymeric lens shall provide a surface coating or chemical surface treatment applied to provide abrasion resistance. The lens of the module shall be integral to the unit, convex with a smooth outer surface and made of plastic. The lens shall have a textured surface to reduce glare.

6. The use of tinting or other materials to enhance ON/OFF contrasts shall not affect chromaticity and shall be uniform across the face of the lens.

7. Each module shall have a symbol of the type of module (i.e. circle, arrow, etc.) in the color of the module. The symbol shall be 1 inch (25.4 mm) in diameter. Additionally, the color shall be written out in 1/2 inch (12.7mm) letters next to the symbol.

(b) Photometric Requirements

1. The minimum initial luminous intensity values for the modules shall conform to the values in Table 1 of the VTCSH (2005) for circular signal indications, and as stated in Table 3 of these specifications for arrow and pedestrian indications at 25°C.

2. The modules shall meet or exceed the illumination values stated in Article 1078.01(3)c of the "Standard Specifications for Road and Bridge Construction," Adopted January 1, 2007 for circular signal indications, and Table 3 of these specifications for arrow and pedestrian indications, throughout the useful life based on normal use in a traffic signal operation over the operating temperature range.

3. The measured chromaticity coordinates of the modules shall conform to the chromaticity requirements of Section 4.2 of the VTCSH (2005).

4. The LEDs utilized in the modules shall be AlInGaP technology for red, yellow, Portland orange (pedestrian) and white (pedestrian) indications, and GaN for green indications, and shall be the ultra bright type rated for 100,000 hours of continuous operation from -40°C to +74°C.

(c) Electrical

1. Maximum power consumption for LED modules is per Table 2.

2. LED modules will have EPA Energy Star compliance ratings, if applicable to that shape, size and color.

3. Operating voltage of the modules shall be 120 VAC. All parameters shall be measured at this voltage.

4. The modules shall be operationally compatible with currently used controller assemblies (solid state load switches, flashers, and conflict monitors).

5. When a current of 20 mA AC (or less) is applied to the unit, the voltage read across the two leads shall be 15 VAC or less.

6. The LED modules shall provide constant light output under power. Modules with dimming capabilities shall have the option disabled or set on a non-dimming operation.

7. The individual LEDs shall be wired such that a catastrophic loss or the failure of one or more LED will not result in the loss of the entire module.

(d) Retrofit Traffic Signal Module

1. The following specification requirements apply to the Retrofit module only. All general specifications apply unless specifically superseded in this section.

2. Retrofit modules can be manufactured under this specification for the following faces:

   a. 12 inch (300 mm) circular, multi-section
   b. 12 inch (300 mm) arrow, multi-section
   c. 12 inch (300 mm) pedestrian, 2 sections

3. Each Retrofit module shall be designed to be installed in the doorframe of a standard traffic signal housing. The Retrofit module shall be sealed in the doorframe with a one-piece EPDM (ethylene propylene rubber) gasket.

4. The maximum weight of a Retrofit module shall be 4 lbs. (1.8 kg).

5. Each Retrofit module shall be a sealed unit to include all parts necessary for operation (a printed circuit board, power supply, a lens and gasket, etc.), and shall be weather proof after installation and connection.

6. Electrical conductors for modules, including Retrofit modules, shall be 39.4 inches (1m) in length, with quick disconnect terminals attached.

7. The lens of the Retrofit module shall be integral to the unit, shall be convex with a smooth outer surface and made of plastic or of glass.

(e) The following specification requirements apply to the 12 inch (300 mm) arrow module only. All general specifications apply unless specifically superseded in this section.

1. The arrow module shall meet specifications stated in Section 9.01 of the Equipment and Material Standards of the Institute of Transportation Engineers (November 1998) [ITE Standards], Chapter 2 (Vehicle Traffic Control Signal Heads) for arrow indications.

2. The LEDs arrow indication shall be a solid display with a minimum of three (3) outlining rows of LEDs and at least one (1) fill row of LEDs.

(f) The following specification requirement applies to the 12 inch (300 mm) programmed visibility (PV) module only. All general specifications apply unless specifically superseded in this section.

1. The LED module shall be a module designed and constructed to be installed in a programmed visibility (PV) signal housing without modification to the housing.

(g) The following specification requirements apply to the 12 inch (300 mm) Pedestrian module only. All general specifications apply unless specifically superseded in this section.

1. Each pedestrian signal LED module shall provide the ability to actuate the solid upraised hand and the solid walking person on one 12 inch (300mm) section.

2. Two (2) pedestrian sections shall be installed. The top section shall be wired to illuminate only the upraised hand and the bottom section shall be the walking man.

3. “Egg Crate” type sun shields are not permitted. All figures must be a minimum of 9 inches (225mm) in height and easily identified from a distance of 120-feet (36.6m).

Basis of Payment.
This item shall be paid for at the contract unit price each for SIGNAL HEAD, LED, of the type specified, which price shall be payment in full for furnishing the equipment described above including signal head, LED(s) modules, all mounting hardware, and installing them in satisfactory operating condition.
The type specified will indicate the number of signal faces, the number of signal sections, and the method of mounting.

Pedestrian head(s) shall be paid for at the contract unit price each for PEDESTRIAN SIGNAL HEAD, LED, of the type specified and of the particular kind of material when specified.

The type specified will indicate the number of faces and the method of mounting.

When installed in an existing signal head, this item shall be paid for at the contract unit price each for SIGNAL HEAD, LED of the type specified, RETROFIT, which price shall be payment in full for furnishing the equipment described above including LED(s) modules, all mounting hardware, and installing them in satisfactory operating condition.

The type specified will indicate the number of signal faces, the number of signal sections, and the method of mounting.

When installed in an existing signal head, this item shall be paid for at the contract unit price each for PEDESTRIAN SIGNAL HEAD, LED, of the type specified, RETROFIT, which price shall be payment in full for furnishing the equipment described above including LED(s) modules, all mounting hardware, and installing them in satisfactory operating condition.

The type specified will indicate the number of faces and the method of mounting.

TABLES

Table 2 Maximum Power Consumption (in Watts)

	Red		Yellow		Green	
Temperature	25°C	74°C	25°C	74°C	25°C	74°C
12 inch (300 mm) circular	11	17	22	25	15	15
12 inch (300 mm) arrow	9	12	10	12	11	11
	Hand–Portland Orange		Person-White			
Pedestrian Indication	6.2		6.3			

Table 3 Minimum Initial & Maintained Intensities for Arrow and Pedestrian Indications (in cd/m^2)

	Red	Yellow	Green
Arrow Indication	5,500	11,000	11,000

PEDESTRIAN COUNTDOWN SIGNAL HEAD, LIGHT EMITTING DIODE.

Description.
This work shall consist of furnishing and installing a pedestrian countdown signal head, with light emitting diodes (LED) of the type specified in the plan.

Pedestrian Countdown Signal Head, Light Emitting Diode, shall conform fully to the SIGNAL HEAD, LIGHT EMITTING DIODE specification, with the following modifications:

(a) Application.

1. Pedestrian Countdown Signal Heads, shall not be used at signalized intersections where traffic signals and railroad warning devices are interconnected.

2. All pedestrian signals at an intersection shall be the same type and have the same display. No mixing of countdown and other types of pedestrian traffic signals will be permitted.

(b) General.

1. The module shall operate in one mode: Clearance Cycle Countdown Mode Only. The countdown module shall display actual controller programmed clearance cycle and shall start counting when the flashing clearance signal turns on and shall countdown to “0” and turn off when the steady Upraised Hand (symbolizing Don’t Walk) signal turns on. Module shall not have user accessible switches or controls for modification of cycle.

2. At power on, the module shall enter a single automatic learning cycle. During the automatic learning cycle, the countdown display shall remain dark.

3. The module shall re-program itself if it detects any increase or decrease of Pedestrian Timing. The counting unit will go blank once a change is detected and then take one complete pedestrian cycle (with no counter during this cycle) to adjust its buffer timer.

4. The module shall allow for consecutive cycles without displaying the steady Upraised Hand.

5. The module shall recognize preemption events and temporarily modify the crossing cycle accordingly.

6. If the controller preempts during the Walking Person (symbolizing Walk), the countdown will follow the controller's directions and will adjust from Walking Person to flashing Upraised Hand. It will start to count down during the flashing Upraised Hand.

7. If the controller preempts during the flashing Upraised Hand, the countdown will continue to count down without interruption.

8. The next cycle, following the preemption event, shall use the correct, initially programmed values.

9. If the controller output displays Upraised Hand steady condition and the unit has not arrived to zero or if both the Upraised Hand and Walking Person are dark for some reason, the unit suspends any timing and the digits will go dark.

10. The digits will go dark for one pedestrian cycle after loss of power of more than 1.5 seconds.

11. The countdown numerals shall be two (2) “7 segment” digits forming the time display utilizing two rows of LEDs.

12. The LED module shall meet the requirements of the Institute of Transportation Engineers (ITE) LED purchase specification, “Pedestrian Traffic Control Signal Indications - Part 2: LED Pedestrian Traffic Signal Modules,” or applicable successor ITE specifications, except as modified herein.

13. The LED modules shall provide constant light output under power. Modules with dimming capabilities shall have the option disabled or set on a non-dimming operation.

14. In the event of a power outage, light output from the LED modules shall cease instantaneously.

15. The LEDs utilized in the modules shall be AlInGaP technology for Portland Orange (Countdown Numerals and Upraised Hand) and GaN technology for Lunar White (Walking Person) indications.

16. The individual LEDs shall be wired such that a catastrophic loss or the failure of one or more LED will not result in the loss of the entire module.

(c) Pedestrian Countdown Signal Heads.

1. Pedestrian Countdown Signal Heads shall be 16 inch (406mm) x 18 inch (457mm), for single units with the housings glossy black polycarbonate. Connecting hardware and mounting brackets shall be polycarbonate (black). A corrosion resistant anti-seize lubricant shall be applied to all metallic mounting bracket joints, and shall be visible to the inspector at the signal turn-on.

2. Each pedestrian signal LED module shall be fully MUTCD compliant and shall consist of double overlay message combining full LED symbols of an Upraised Hand and a Walking Person. "Egg Crate" type sun shields are not permitted. Numerals shall measure 9 inches (229mm) in height and easily identified from a distance of 120 feet (36.6m).

(d) Electrical.

1. Maximum power consumption for LED modules is 29 watts.

2. The measured chromaticity shall remain unchanged over the input line voltage range listed of 80 VAC to 135 VAC.

Basis of Payment.
This item shall be paid for at the contract unit price each for PEDESTRIAN COUNTDOWN SIGNAL HEAD, LED, of the type specified, which shall be payment in full for furnishing the equipment described above including LED(s) modules, all mounting hardware, and installing them in satisfactory operating condition. The type specified will indicate the number of faces and the method of mounting.

FULL-ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL.

This work shall consist of furnishing and installing an "Econolite" brand traffic actuated solid state digital controller (ASC3-2100) in a NEMA TS2 Type 1 controller cabinet, meeting the requirements of the Standard Specifications Section 857 and the included Traffic Signal Specifications.

Basis of Payment: This work shall be paid for at the contract unit price each for FULL-ACTUATED CONTROLLER AND CABINET (SPECIAL) of the type specified, which shall be payment in full for furnishing and installing the controller complete including conflict monitor, load switches and flasher relays, with necessary connections for proper operation.

The type specified will indicate the type of cabinet. For example, FULL-ACTUATED CONTROLLER AND TYPE IV CABINET (SPECIAL).

ELECTRIC CABLE IN CONDUIT, SIGNAL, NO. 18, 3/C

This work shall consist of furnishing and installing a Belden YR52311 electric cable, or approved equal, in existing and/or new conduit. The cable shall consist of 18 AWG stranded bare copper, three (3) conductors, with HDPE insulation, and HDPE jacket and shall be capable of broadband over power communication. The nominal outside diameter shall be 0.341-inch.

The signal cable, No. 18, 3/C shall be run directly from the Autoscope Terra Interface Panel (TIP) to the Autoscope Terra MVP on the mast arm with no splicing of the cable allowed.

Basis of Payment: This work will be paid for at the contract unit price per foot for ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 18, 3/C, which price shall be payment in full for furnishing, installing and making all electrical connections necessary for proper operation.

VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION).

Note: The McHenry County Division of Transportation currently uses Autoscope Solo Terra Video Detection equipment.

1. Video Detection – General

This specification sets forth the minimum requirements for a system that monitors vehicles on a roadway via processing of video images. The detection of vehicles passing through the field-of-view of an image sensor shall be made available to a large variety of end user applications as simple contact closure outputs that reflect the current real-time detector or alarm states (on/off) or as summary traffic statistics that are reported locally or remotely. The contact closure outputs shall be provided to a traffic signal controller and comply with the National Electrical Manufacturers Association (NEMA) type C or D detector rack or 170 input file rack standards.

The system architecture shall fully support Ethernet networking of system components through a variety of industry standard and commercially available infrastructures that are used in the traffic industry. The data communications shall support direct connect, [modem,] and multi-drop interconnects. Simple, standard Ethernet wiring shall be supported to minimize overall system cost and improve reliability, utilizing existing infrastructure and ease of system installation and maintenance. Both streaming video and data communications shall optionally be interconnected over long distances through fiber optic, microwave, or other commonly used digital communications transport configurations.

On the software application side of the network, the system shall be integrated through a client-server relationship. A communications server application shall provide the data communications interface between as few as one to as many as hundreds of Machine Vision Processor (MVP) sensors and a number of client applications. The client applications shall either be hosted on the same PC as the communications server or may be distributed over a local area network of PC's using the industry standard TCP/IP network protocol. Multiple client applications shall execute simultaneously on the same host or multiple hosts, depending on the network configuration. Additionally, a web-browser interface shall allow use of industry standard Internet web browsers to connect to MVP sensors for setup, maintenance, and playing digital streaming video.

1.1. System Hardware

The machine vision system hardware shall consist of three components: 1) a color, 22x zoom, MVP sensor 2) a modular cabinet interface unit 3) a communication interface panel. Additionally, an optional personal computer (PC) shall host the server and client applications that are used to program and monitor the system components. The real-time performance shall be observed by viewing the video output from the sensor with overlaid flashing detectors to indicate the current detection state (on/off). The MVP sensor shall optionally store cumulative traffic statistics internally in non-volatile memory for later retrieval and analysis.

The MVP shall communicate to the modular cabinet interface unit via the communications interface panel and the software applications using the industry standard TCP/IP network protocol. The MVP shall have a built-in, Ethernet-ready, Internet Protocol (IP) address and shall be addressable with no plug in devices or converters required. The MVP shall provide standard MPEG-4 streaming digital video. Achievable frame rates shall vary from 5 to 30 frames/sec as a function of video quality and available bandwidth.

The modular cabinet interface unit shall communicate directly with up to eight (8) MVP sensors and shall comply with the form factor and electrical characteristics to plug directly into a NEMA type C or D detector rack providing up to thirty-two (32) inputs and sixty-four (64) outputs or a 170 input file rack providing up to sixteen (16) contact closure inputs and twenty-four (24) contact closure outputs to a traffic signal controller.

The communication interface panel shall provide four (4) sets of three (3) electrical terminations for three-wire power cables for up to eight (8) MVP sensors that may be mounted on a pole or mast arm with a traffic signal cabinet or junction box. The communication interface panel shall provide high-energy transient protection to electrically protect the modular cabinet interface unit and connected MVP sensors. The communications interface panel shall provide single-point Ethernet connectivity via RJ45 connector for communication to and between the modular cabinet interface module and the MVP sensors.

1.2. System Software

The MVP sensor embedded software shall incorporate multiple applications that perform a variety of diagnostic, installation, fault tolerant operations, data communications, digital video streaming, and vehicle detection processing. The detection shall be reliable, consistent, and perform under all weather, lighting, and traffic congestion levels. An embedded web server shall permit standard internet browsers to connect and perform basic configuration, maintenance, and video streaming services.

There shall be a suite of client applications that reside on the host client / server PC. The applications shall execute under Microsoft Windows XP or Vista. Available client applications shall include:

- Master network browser: Learn a network of connected modular cabinet interface units and MVP sensors, display basic information, and launch applications software to perform operations within that system of sensors.
- Configuration setup: Create and modify detector configurations to be executed on the MVP sensor and the modular cabinet interface unit.
- Operation log: Retrieve, display, and save field hardware run-time operation logs of special events that have occurred.
- Software install: Reconfigure one or more MVP sensors with a newer release of embedded system software.
- Streaming video player: Play and record streaming video with flashing detector overlay.
- Data retrieval: Fetch once or poll for traffic data and alarms and store on PC storage media.
- Communications server: Provide fault-tolerant, real-time TCP/IP communications to / from all devices and client applications with full logging capability for systems integration.

2. Functional Capabilities

2.1. MVP Sensor

The MVP sensor shall be an integrated imaging color CCD array with zoom lens optics, high-speed, dual-core image processing hardware bundled into a sealed enclosure. The CCD array shall be directly controlled by the dual-core processor, thus providing high-quality video for detection that has virtually no noise to degrade detection performance. It shall be possible to zoom the lens as required for setup and operation. It shall provide JPEG video compression as well as standard MPEG-4 digital streaming video with flashing detector overlay. The MVP shall provide direct real-time iris and shutter speed control. The MVP image sensor shall be equipped with an integrated 22x zoom lens that can be changed using either configuration computer software. The digital streaming video output and all data communications shall be transmitted over the three-wire power cable.

2.1.1. Power

The MVP sensor shall operate on 110/220 VAC, 50/60Hz at a maximum of 25 watts. The camera and processor electronics shall consume a maximum of 10 watts and the remaining 15 watts shall support an enclosure heater.

2.1.2. Detection Zone Programming

Placement of detection zones shall be by means of a PC with a Windows XP or Vista operating system, a keyboard, and a mouse. The PC monitor shall be able to show the detection zones superimposed on images of traffic scenes.

The detection zones shall be created by using a mouse to draw detection zones on the PC monitor. Using the mouse and keyboard it shall be possible to place, size, and orient detection zones to provide optimal road coverage for vehicle detection. It shall be possible to download detector configurations from the PC to the MVP sensor and cabinet interface module, to retrieve the detector configuration that is currently running in the MVP sensor, and to back up detector configurations by saving them to the PC fixed disks or other removable storage media.

The supervisor computer's mouse and keyboard shall be used to edit previously defined detector configurations to permit adjustment of the detection zone size and placement, to add detectors for additional traffic applications, or to reprogram the MVP sensor for different traffic applications or changes in installation site geometry or traffic rerouting.

2.1.3. Optimal Detection

The video detection system shall optimally detect vehicle passage and presence when the MVP sensor is mounted 30 feet (10 m) or higher above the roadway, when the image sensor is adjacent to the desired coverage area, and when the distance to the farthest detection zone locations are not greater than ten (10) times the mounting height of the MVP. The recommended deployment geometry for optimal detection also requires that there be an unobstructed view of each traveled lane where detection is required. Although optimal detection may be obtained when the MVP is mounted directly above the traveled lanes, the MVP shall not be required to be directly over the roadway. The MVP shall be able to view either approaching or receding traffic or both in the same field of view. The preferred MVP sensor orientation shall be to view approaching traffic since there are more high contrast features on vehicles as viewed from the front rather than the rear. The MVP sensor placed at a mounting height that minimizes vehicle image occlusion shall be able to simultaneously monitor a maximum of six (6) traffic lanes when mounted at the road-side or up to eight (8) traffic lanes when mounted in the center with four lanes on each side.

2.2. Modular Cabinet Interface Unit

The modular cabinet interface unit shall provide the hardware and software means for up to eight (8) MVP sensors to communicate real-time detection states and alarms to a local traffic signal controller. It shall comply with the electrical and protocol specifications of the detector rack standards. The card shall have 1500 Vrms isolation between rack logic ground and street wiring.

The modular cabinet interface unit shall be a simple interface card that plugs directly into a 170 input file rack or a NEMA type C or D detector rack. The modular cabinet interface unit shall occupy only 2 slots of the detector rack. The modular cabinet interface unit shall accept up to sixteen (16) phase inputs and shall provide up to twenty-four (24) detector outputs.

2.3. Communications Interface Panel

The communications interface panel shall support up to eight MVPs. The communications interface panel shall accept 110/220 VAC, 50/60 Hz power and provide predefined wire termination blocks for MVP power connections, a Broadband-over-Power-Line (BPL) transceiver to support up to 10MB/s interdevice communications, electrical surge protectors to isolate the modular cabinet interface unit and MVP sensors, and an interface connector to cable directly to the modular cabinet interface unit.

The interface panel shall provide power for up to eight (8) MVP sensors, taking local line voltage 110/220 VAC, 50/60 Hz and producing 110/220 VAC, 50/60 Hz, at about 30 watts to each MVP sensor. Two ½-amp SLO-BLO fuses shall protect the communications interface panel.

3. System Installation & Training

The supplier of the video detection system may supervise the installation and testing of the video detection system and computer equipment as required by the contracting agency.

Training is available to personnel of the contracting agency in the operation, set up, and maintenance of the video detection system. The MVP sensor and its support hardware / software is a sophisticated leading-edge technology system. Proper instruction from certified instructors is recommended to ensure that the end user has complete competency in system operation. The User's Guide is not an adequate substitute for practical classroom training and formal certification by an approved agency.

4. Warranty, Service, & Support

For a minimum of two (2) years, the supplier shall warrant the video detection system. An option for additional year(s) warranty for up to 5 years shall be available. Ongoing software support by the supplier shall include software updates of the MVP sensor, modular cabinet interface unit, and supervisor computer applications. These updates shall be provided free of charge during the warranty period. The supplier shall maintain a program for technical support and software updates following expiration of the warranty period. This program shall be available to the contracting agency in the form of a separate agreement for continuing support.

APPENDIX E

MCDOT RED LIGHT RUNNING POLICY

Automated Traffic Law Enforcement Systems Policy: Red Light Running (RLR) Camera Enforcement Systems and Automated Railroad Grade Crossing (RGC) Enforcement Systems

McHenry County Division of Transportation

Effective August, 2007

INTRODUCTION

Public Act 94-0795 (See Attachment A), which was signed on May 22, 2006, and took effect upon signature of the Governor, provides that a governmental agency in a municipality or county may establish an automated traffic law enforcement system that produces a recorded image of a motor vehicle entering an intersection against a red signal indication and is designed to obtain a clear recorded image of the vehicle and the vehicle's license plate. The installation of RLR Camera Systems may be established only in the counties of Cook, DuPage, Kane, Lake, Madison, McHenry, St. Clair, and Will and in municipalities located within those counties.

Public Act 94-0771 (See Attachment B), which was signed on May 16, 2006, and takes effect on January 1, 2007, allows local agencies to work with the Illinois Commerce Commission (ICC), the Illinois Department of Transportation (IDOT), and local law enforcement officials, to establish an automated RGC enforcement system (photo or video enforcement system) at highway railroad grade crossings designated by local agency ordinance. The system shall produce a clear recorded image of the vehicle, driver, and vehicle registration plate. The installation of the automated RGC enforcement systems is not restricted to specific counties or municipalities.

This document has been prepared by the IDOT and revised by the McHenry County Division of Transportation (MCDOT) to assist local jurisdictions in the procedures required for the installation of automated traffic law enforcement systems which shall encompass RLR Camera Systems by MCDOT Permit at signalized intersections that include County Highways and automated RGC enforcement systems on State and Local routes.

OVERVIEW

Enhanced traffic safety is the principal aim of the Automated Traffic Law Enforcement Systems Program. RLR Camera Systems should be installed only where a safety problem with red light running has been documented and alternative countermeasures have been implemented. Automated RGC enforcement systems should only be utilized at pubic highway railroad grade crossings experiencing excessive gate violations or significant crash histories and when other safety measures such as automatic flashing light signals and gates, constant warning time circuitry, and enforcement by local law enforcement officials have not been effective.

The Permit Applicant is the local municipality requesting authorization to install and operate a RLR Camera System at signalized intersections that include County highways. For automated RGC enforcement systems on State marked and unmarked routes, the local agency shall obtain a permit from IDOT.

RED LIGHT RUNNING (RLR) CAMERA ENFORCEMENT SYSTEMS

RLR CAMERA SYSTEM DESCRIPTION

RLR Cameras monitor the movement of traffic at designated traffic signal locations and the status (or color) of the traffic signal indication on the approach. Movement detectors, typically video detectors, check for the passage of vehicles into the intersection and if the traffic signal phase condition is red, cause pole mounted cameras to record pictures of the vehicle position and license plate. RLR Camera Systems shall differentiate between vehicles running a red light and those vehicles stopping slightly beyond the stop bar or those vehicles, after stopping, making a legal turn against a red indication.

All enforcement measures required by Act 5 of Chapter 625 of the Illinois Compiled Statutes relating to automated traffic law enforcement for red lights and rail crossings are the sole responsibility of the applicant.

RLR CAMERA SYSTEM ELIGIBLE LOCATIONS

Signalized intersections that are eligible for RLR Cameras include all the following characteristics:

- Crashes attributable to red light violations.
- Documented history of red light violations where corrective actions have been previously implemented.
- Traffic signal heads have 12-inch displays with LED optics.
- Mast arm poles are used to mount signal heads on the far side of each approach leg.
- A minimum of 3 signal displays exist for through movements and 2 signal displays for left turning movements.
- Sight distance meets MUTCD minimums.

RLR CAMERA SYSTEM RESTRICTED LOCATIONS

Signalized intersections that are ineligible for RLR Cameras may include the following characteristics:

- Traffic signal is interconnected to railroad crossing controlled devices.
- Installation of RLR Camera equipment reduces existing sight distance of traffic signal devices, signage, or adversely impacts pedestrian facilities.
- Where installation of RLR Camera equipment can not meet MCDOT roadway set-back minimums, or other MCDOT construction requirements.
- Installations of RLR that would negatively impact intersection operations. Additional restrictions may be identified at a later date. The Division of Transportation may notify the Permit Applicant of changes that may affect them.

RLR CAMERA SYSTEM JUSTIFICATION

A Justification Report shall be prepared by the Permit Applicant for the locations in which the local agency wishes to establish a RLR Camera System. The Justification Report shall include the following:

- Intersection location(s), including street names, municipality, and county.
- Brief geometric description of the intersection(s) and land usage.
- Crash data and collision diagrams should be submitted if available. It is recommended that the most recent three (3) years of available crash data be used and include the crash type, specifically left turn, angle and rear end crashes.
- Average daily and peak period traffic volumes, if available.
- Approach angles and speed limits.
- Existing traffic control devices, including signal head displays, location, phasing, if the traffic signal is part of a closed loop system or interconnected to adjacent railroad crossing control devices.
- Information concerning bicycle and pedestrian conditions at the intersection.
- A letter of concurrence for the use of RLR Cameras from a representative from the roadway authority having jurisdiction of the intersecting local roadway.
- A letter from the chief of the local law enforcement agency certifying that the intersections proposed for RLR Camera Systems experience red light violations and crashes resulting from such. This letter shall also include a statement of concurrence for the use of automated RLR Camera Systems.

SUBMITTAL REQUIREMENTS FOR APPROVED RLR CAMERA SYSTEM INSTALLATION

The Permit Applicant shall submit to the Department the following items for consideration:

- The Justification Report for the RLR Camera System installation.
- Detailed construction plans showing all proposed RLR Camera System and existing traffic signal equipment, as outlined in the Division of Transportation's Traffic Signal Design Guidelines.
- Signing plans.
- Manufacturer literature and wiring diagrams.
- Description of how the RLR Camera System will be operated and maintained.
- The Permit Applicant shall obtain an ordinance or resolution agreeing to indemnify the County of McHenry for any claims brought forth as a result of the RLR Camera System, its

installation, operation, maintenance and removal (See Attachment C). A copy of the local ordinance for an automated traffic law enforcement system program. The Division of Transportation's maintained traffic signal clearance intervals shall meet or exceed minimums set by the MUTCD. The Division of Transportation will verify clearances upon request. Yellow change and all-red clearance interval timings are determined by the Division of Transportation and subject to change as warranted by the Division of Transportation without notification.

The MCDOT may at its sole discretion deny a permit application and such denial shall be final and conclusive.

SIGNING REQUIREMENTS

Signs (See Attachment D) (R10-I104) shall be posted in advance of each intersection approach, and within the RLR enforcement intersection, typically on the far side traffic signal pole, indicating the presence of RLR Cameras at the intersection. The Permit Applicant shall provide, install, and maintain the signs and shall coordinate with the Division of Transportation prior to any installations.

OPERATIONAL REQUIREMENTS

To minimize the impact on the County highway system, RLR Camera Systems shall not affect the operation of any traffic control device. The following items will be required:

- Electrical service for RLR Camera System equipment shall come from the local electric utility company, not from traffic signal equipment or other McHenry County facilities.
- To obtain status of the traffic signals, miniature current transformers may be installed on yellow and red signal circuits. RLR Camera System circuitry shall not be connected to traffic signal cables by cutting, splicing, sharing terminations or other means. No other RLR circuitry and equipment will be allowed in and/or on traffic signal facilities, including but not limited to the traffic signal cabinet, associated electrical conduit, junction boxes, handholes, mast arm poles or signal posts.
- RLR vehicle detection shall utilize video or laser technology. Pavement loops may be considered on a location by location basis, subject to approval by the Division of Transportation. Consideration will be based on pavement type and condition, existing and preferred traffic signal detection methods and designs, and consideration of potential countermeasures for saw cutting such as milling and resurfacing.
- All work inside the MCDOT traffic signal controller cabinet or other MCDOT facilities, shall be done by a MCDOT approved contractor.
- All RLR Camera System settings shall be reviewed and approved by the Division of Transportation prior to the

scheduled “Turn-On”. Post “Turn-On” adjustments may be necessary and shall be monitored and approved by the Division of Transportation prior to implementation. The intent is to ensure that there is no negative impact to the Division of Transportation’s traffic signal operations.

- Tickets shall not be issued for legal right turn on red.
- The Permit Applicant shall certify that the system is operating correctly and shall make all adjustments necessary to ensure it operates correctly and does not negatively impact the traffic operations of the intersection.

COSTS AND MAINTENANCE

All costs for the materials, installation, operation, maintenance, repair, and removal of the RLR Camera System shall be the responsibility of the Permit Applicant. All RLR Camera System materials shall be reviewed and approved by the Division of Transportation prior to installation. RLR Camera System equipment installed in or on the Division of Transportation’s traffic signal equipment shall be completed in accordance with the appropriate district electrical maintenance policies. If the Division of Transportation improves an intersection where a RLR Camera System is installed, the removal and re-installation shall be the responsibility of the Permit Applicant and shall be completed in a timely manner. All costs for this work shall be the responsibility of the Permit Applicant.

The RLR Camera System shall be inspected and “Turned-On” as detailed in the Division of Transportation’s Traffic Signal Specifications.

PUBLIC INFORMATION CAMPAIGN

The Permit Applicant shall hold well-publicized kickoff events and issue periodic press releases about the proposed locations and effectiveness of RLR Camera enforcement within their jurisdictions. This campaign should provide information and data that defines the red light running problem, explains why red light running is dangerous, and identifies the actions that are currently being undertaken to reduce the incidence of red light running. For the first week of live RLR camera enforcement, the Permit Applicant shall take measures to bring attention to the intersections where the RLR camera systems are in use. At a minimum, an orange or red flag shall be attached to the RLR signs.

The Permit Applicant should also consider the issuance of warning citations to likely violators for a limited period, and publicize the date on which warning citations will be halted and actual enforcement citations will begin.

FOLLOW UP EVALUATION

An Evaluation Report shall be prepared by the Permit Applicant one year after the installation and shall be prepared every three years thereafter. The Evaluation Report shall include the following:

- Intersection location(s)
- Date of implementation.

- RLR Camera System manufacturer and contractor name.
- Crash data specific to RLR location(s) for the 3-year period prior to and for the period post RLR Camera installation.
- An analysis of the crash data, including a summary of any increase in crash types.
- Signal timing and other settings before and after RLR Camera installation.
- Traffic volumes before and after RLR Camera System installation.
- Recommendations to further reduce red light violations and severe crashes and to improve the operations of the intersection(s).
- Summary of adjudication experience and results.
- The permit may be revoked during this annual review or at any time where the Division of Transportation determines it is in the best interest of the motoring public of Illinois or if the RLR Camera System is having a detrimental effect on the operations of the existing traffic signal system.

Automated Railroad Grade Crossing (RGC) Enforcement Systems

AUTOMATED RGC ENFORCEMENT SYSTEM DESCRIPTION

Automated RGC enforcement systems monitor the movement of traffic at designated highway railroad grade crossings and the status of the crossing gate or barrier on the approach. Movement detectors, typically video detectors, check if the gate or barrier is closed or is being opened or closed and check for the passage of vehicles into the crossing area and cause pole mounted cameras to record pictures of the vehicle position and license plate. Automated RGC enforcement systems shall differentiate between vehicles violating gate crossing warning devices and vehicles already in and clearing the crossing zone.

CAMERA SYSTEM ELIGIBLE LOCATIONS

An automated RGC enforcement system may be utilized at pubic highway railroad grade crossing locations experiencing excessive gate violations or significant crash histories when other safety measures such as automatic flashing light signals and gates, constant warning time circuitry, and enforcement by local law enforcement officials have not been effective. Additionally, safety improvement projects to install an automated RGC enforcement system will only be considered at highway railroad grade crossing locations having a minimum of 1,000 vehicles per day and a crash history of at least 5 crashes in a 5 year period, or upon a recommendation from a diagnostic team review finding that photo enforcement is appropriate at that location. Documentation of local law enforcement efforts will be required.

APPLICATION PROCESS

A representative from the roadway authority having jurisdiction at the highway railroad grade crossing location where automated RGC enforcement is being proposed should provide a written notice to the ICC showing interest in the concept of automated RGC enforcement. This notice shall include concurrence of the concept by the local law enforcement agency. All requests should be directed to:

Michael E. Stead
Rail Safety Program Administrator
Illinois Commerce Commission
527 E. Capitol Avenue
Springfield, Illinois 62701

Upon receipt of the request for automated RGC enforcement systems, the ICC will direct the local agency to schedule an on-site diagnostic team review to determine if installation of an automated RGC enforcement system is appropriate at that location. The diagnostic review team shall as a minimum, include representatives from the ICC, IDOT, the railroad company, the respective roadway authority, and a representative from the local law enforcement agency. The ICC will include IDOT in all correspondence received from local agencies regarding automated RGC enforcement systems; IDOT will do the same.

If an automated RGC enforcement system is deemed to be appropriate by the diagnostic review team, the local agency must pass a local ordinance requesting the creation of such a system. The Permit Applicant shall also obtain an ordinance or resolution agreeing to indemnify the State of Illinois for any claims brought forth as a result of the automated RGC enforcement system, its installation, operation, maintenance and removal (See Attachment C). Once these ordinances are in place, potential funding sources should be identified, and operation and maintenance responsibilities clarified. After these issues have been resolved, the ICC will issue a Stipulated Agreement for the parties to review. Following execution of the Stipulated Agreement by all of the parties involved, the ICC will issue an Order authorizing the proposed safety improvement.

COSTS AND MAINTENANCE

Subject to availability of funding, state or federal funds for automated RGC enforcement will be provided only upon recommendation by a diagnostic review team. Potential sources of funding for photo enforcement systems may include the Grade Crossing Protection Fund (GCPF), local funds, or federal funds. Funding for automated RGC enforcement systems will be limited to a maximum contribution of 50% of the cost of the materials and installation only, not to exceed $200,000, with all remaining costs, including all future maintenance and operation of the photo enforcement system to be funded, and operated by the local agency. When federal funds are being proposed for automated enforcement systems, eligibility for the reimbursement of federal funds is subject to the Federal Highway Administration (FHWA) providing approval and authorization of the federal funds for the project prior to the commencement of any federally reimbursable work items. Any project-related work done prior to federal authorization will not be eligible for reimbursement with federal funds. For projects to install automated RGC enforcement systems at highway railroad grade crossings

located on the local road system, written requests for assistance from the Grade Crossing Protection Funds should be submitted to:

Mr. Michael Stead
Rail Safety Program Administrator
Illinois Commerce Commission
527 E. Capitol Avenue
Springfield, Illinois 62701.

Requests for assistance from IDOT for projects to install automated RGC enforcement systems at highway railroad grade crossings should be submitted in writing to:

Mr. Charles Ingersoll, P.E.
Engineer of Local Roads and Streets,
Attn: Jeff Harpring, Room 205
Illinois Department of Transportation
2300 S. Dirksen Parkway
Springfield, Illinois 62764.

SIGNING REQUIREMENTS

Signs (See Attachment E) (R10-I105) shall be posted in advance of each approach to the highway railroad grade crossing indicating the presence of automated RGC enforcement at the site. The signs shall include that verbiage that citations will be issued and include the amount of the fine for the violation. The Permit Applicant shall provide, install, and maintain the signs and shall coordinate with the IDOT prior to any installations on state routes.

OPERATIONAL REQUIREMENTS

To minimize the impact on the state highway system, automated RGC enforcement systems shall not affect the operation of any traffic control devices. The following items will be required:

- Electrical service for automated RGC enforcement system equipment shall come from the local electric utility company, not from traffic signal equipment or other State facilities.
- Automated RGC enforcement systems shall utilize video or laser technology for vehicle detection. Pavement loops are not acceptable for vehicle detection for automated RGC enforcement systems located on any state routes.
- All automated RGC enforcement system settings shall be reviewed and approved by the ICC and IDOT (state routes only) prior to the scheduled “Turn-On”.

PUBLIC INFORMATION CAMPAIGN

The Permit Applicant shall hold well-publicized kickoff events and issue periodic press releases about the proposed locations and effectiveness of automated RGC enforcement within their jurisdictions. This campaign should provide information and data that defines the highway railroad gate violation problem, explains why running around railroad crossing gates is dangerous, identifies the actions that are currently being undertaken to reduce the incidence of violations of down railroad crossing gates, and includes the penalties for violation of the law. For the first week of live RGC enforcement, the Permit Applicant shall take measure to bring attention to the intersections where the RGC camera systems are in use. At a minimum, an orange or red flag shall be attached to the RGC signs. The Permit Applicant should also consider the issuance of warning citations to likely violators for a limited period, and publicize the date on which warning citations will be halted and actual enforcement citations will begin.

FOLLOW UP EVALUATION

An Evaluation Report shall be prepared by the Permit Applicant one year after the installation of an automated RGC enforcement system and shall be prepared every three years thereafter. The Report shall include the following:

- Location
- Date of implementation.
- Automated RGC enforcement system's manufacturer and contractor name.
- Crash data specific to highway railroad grade crossings with automated RGC enforcement systems for the 3-year period prior to and after automated RGC enforcement system installation.
- An analysis of the crash data; including a summary of any increase in crash types.
- Summary of adjudication experience and results.

The permit may be revoked during this annual review or at any time where the Department determines it is in the best interest of the motoring public of Illinois or if the automated RGC enforcement system is having a detrimental effect on the operations of the specific state roadway.

ATTACHMENTS

A. Public Act 094-0795
B. Public Act 094-0771
C. Example of Indemnification Ordinance
D. Illinois Standard R10-I104: RLR Sign
E. Illinois Standard R10-I105: RGC Sign

Public Act 094-0795

HB4835 Enrolled LRB094 19060 DRH 54562 b

AN ACT concerning transportation.

Be it enacted by the People of the State of Illinois, represented in the General Assembly:

Section 5. The Illinois Vehicle Code is amended by changing Sections 6-306.5, 11-208, 11-208.3, and 11-306 and adding Sections 1-105.2, 11-208.6, and 11-612 as follows:

(625 ILCS 5/1-105.2 new)

Sec. 1-105.2. Automated traffic law violation. A violation described in Section 11-208.6 of this Code.

(625 ILCS 5/6-306.5) (from Ch. 95 1/2, par. 6-306.5)

Sec. 6-306.5. Failure to pay fine or penalty for standing, parking, ~~or~~ compliance, or automated traffic law violations; suspension of driving privileges.

(a) Upon receipt of a certified report, as prescribed by subsection (c) of this Section, from any municipality stating that the owner of a registered vehicle has: (1) failed to pay any fine or penalty due and owing as a result of 10 or more violations of a municipality's vehicular standing, parking, or compliance regulations established by ordinance pursuant to Section 11-208.3 of this Code, or (2) failed to pay any fine or penalty due and owing as a result of 5 offenses for automated traffic violations as defined in Section 11-208.6, the Secretary of State shall suspend the driving privileges of such person in accordance with the procedures set forth in this Section. The Secretary shall also suspend the driving privileges of an owner of a registered vehicle upon receipt of a certified report, as prescribed by subsection (f) of this Section, from any municipality stating that such person has failed to satisfy any fines or penalties imposed by final judgments for 5 or more automated traffic law violations or 10 or more violations of local standing, parking, or compliance

regulations after exhaustion of judicial review procedures.

(b) Following receipt of the certified report of the municipality as specified in this Section, the Secretary of State shall notify the person whose name appears on the certified report that the person's drivers license will be suspended at the end of a specified period of time unless the Secretary of State is presented with a notice from the municipality certifying that the fine or penalty due and owing the municipality has been paid or that inclusion of that person's name on the certified report was in error. The Secretary's notice shall state in substance the information contained in the municipality's certified report to the Secretary, and shall be effective as specified by subsection (c) of Section 6-211 of this Code.

(c) The report of the appropriate municipal official notifying the Secretary of State of unpaid fines or penalties pursuant to this Section shall be certified and shall contain the following:

(1) The name, last known address as recorded with the Secretary of State, as provided by the lessor of the cited vehicle at the time of lease, or as recorded in a United States Post Office approved database if any notice sent under Section 11-208.3 of this Code is returned as undeliverable, and drivers license number of the person who failed to pay the fine or penalty and the registration number of any vehicle known to be registered to such person in this State.

(2) The name of the municipality making the report pursuant to this Section.

(3) A statement that the municipality sent a notice of impending drivers license suspension as prescribed by ordinance enacted pursuant to Section 11-208.3, to the person named in the report at the address recorded with the Secretary of State or at the last address known to the lessor of the cited vehicle at the time of lease or, if any notice sent under Section 11-208.3 of this Code is returned

as undeliverable, at the last known address recorded in a United States Post Office approved database; the date on which such notice was sent; and the address to which such notice was sent. In a municipality with a population of 1,000,000 or more, the report shall also include a statement that the alleged violator's State vehicle registration number and vehicle make, if specified on the automated traffic law violation notice, are correct as they appear on the citations.

(d) Any municipality making a certified report to the Secretary of State pursuant to this Section shall notify the Secretary of State, in a form prescribed by the Secretary, whenever a person named in the certified report has paid the previously reported fine or penalty or whenever the municipality determines that the original report was in error. A certified copy of such notification shall also be given upon request and at no additional charge to the person named therein. Upon receipt of the municipality's notification or presentation of a certified copy of such notification, the Secretary of State shall terminate the suspension.

(e) Any municipality making a certified report to the Secretary of State pursuant to this Section shall also by ordinance establish procedures for persons to challenge the accuracy of the certified report. The ordinance shall also state the grounds for such a challenge, which may be limited to (1) the person not having been the owner or lessee of the vehicle or vehicles receiving 10 or more standing, parking, or compliance violation notices or 5 or more automated traffic law violations on the date or dates such notices were issued; and (2) the person having already paid the fine or penalty for the 10 or more standing, parking, or compliance violations or 5 or more automated traffic law violations indicated on the certified report.

(f) Any municipality, other than a municipality establishing vehicular standing, parking, and compliance regulations pursuant to Section 11-208.3 or automated traffic

law regulations under Section 11-208.6, may also cause a suspension of a person's drivers license pursuant to this Section. Such municipality may invoke this sanction by making a certified report to the Secretary of State upon a person's failure to satisfy any fine or penalty imposed by final judgment for 10 or more violations of local standing, parking, or compliance regulations or 5 or more automated traffic law violations after exhaustion of judicial review procedures, but only if:

(1) the municipality complies with the provisions of this Section in all respects except in regard to enacting an ordinance pursuant to Section 11-208.3;

(2) the municipality has sent a notice of impending drivers license suspension as prescribed by an ordinance enacted pursuant to subsection (g) of this Section; and

(3) in municipalities with a population of 1,000,000 or more, the municipality has verified that the alleged violator's State vehicle registration number and vehicle make are correct as they appear on the citations.

(g) Any municipality, other than a municipality establishing standing, parking, and compliance regulations pursuant to Section 11-208.3 or automated traffic law regulations under Section 11-208.6, may provide by ordinance for the sending of a notice of impending drivers license suspension to the person who has failed to satisfy any fine or penalty imposed by final judgment for 10 or more violations of local standing, parking, or compliance regulations or 5 or more automated traffic law violations after exhaustion of judicial review procedures. An ordinance so providing shall specify that the notice sent to the person liable for any fine or penalty shall state that failure to pay the fine or penalty owing within 45 days of the notice's date will result in the municipality notifying the Secretary of State that the person's drivers license is eligible for suspension pursuant to this Section. The notice of impending drivers license suspension shall be sent by first class United States mail, postage

prepaid, to the address recorded with the Secretary of State or at the last address known to the lessor of the cited vehicle at the time of lease or, if any notice sent under Section 11-208.3 of this Code is returned as undeliverable, to the last known address recorded in a United States Post Office approved database.

(h) An administrative hearing to contest an impending suspension or a suspension made pursuant to this Section may be had upon filing a written request with the Secretary of State. The filing fee for this hearing shall be $20, to be paid at the time the request is made. A municipality which files a certified report with the Secretary of State pursuant to this Section shall reimburse the Secretary for all reasonable costs incurred by the Secretary as a result of the filing of the report, including but not limited to the costs of providing the notice required pursuant to subsection (b) and the costs incurred by the Secretary in any hearing conducted with respect to the report pursuant to this subsection and any appeal from such a hearing.

(i) The provisions of this Section shall apply on and after January 1, 1988.

(j) For purposes of this Section, the term "compliance violation" is defined as in Section 11-208.3.

(Source: P.A. 94-294, eff. 1-1-06.)

(625 ILCS 5/11-208) (from Ch. 95 1/2, par. 11-208)

Sec. 11-208. Powers of local authorities.

(a) The provisions of this Code shall not be deemed to prevent local authorities with respect to streets and highways under their jurisdiction and within the reasonable exercise of the police power from:

1. Regulating the standing or parking of vehicles, except as limited by Section 11-1306 of this Act;

2. Regulating traffic by means of police officers or traffic control signals;

3. Regulating or prohibiting processions or

assemblages on the highways;

4. Designating particular highways as one-way highways and requiring that all vehicles thereon be moved in one specific direction;

5. Regulating the speed of vehicles in public parks subject to the limitations set forth in Section 11-604;

6. Designating any highway as a through highway, as authorized in Section 11-302, and requiring that all vehicles stop before entering or crossing the same or designating any intersection as a stop intersection or a yield right-of-way intersection and requiring all vehicles to stop or yield the right-of-way at one or more entrances to such intersections;

7. Restricting the use of highways as authorized in Chapter 15;

8. Regulating the operation of bicycles and requiring the registration and licensing of same, including the requirement of a registration fee;

9. Regulating or prohibiting the turning of vehicles or specified types of vehicles at intersections;

10. Altering the speed limits as authorized in Section 11-604;

11. Prohibiting U-turns;

12. Prohibiting pedestrian crossings at other than designated and marked crosswalks or at intersections;

13. Prohibiting parking during snow removal operation;

14. Imposing fines in accordance with Section 11-1301.3 as penalties for use of any parking place reserved for persons with disabilities, as defined by Section 1-159.1, or disabled veterans by any person using a motor vehicle not bearing registration plates specified in Section 11-1301.1 or a special decal or device as defined in Section 11-1301.2 as evidence that the vehicle is operated by or for a person with disabilities or disabled veteran;

15. Adopting such other traffic regulations as are specifically authorized by this Code; or

16. Enforcing the provisions of subsection (f) of Section 3-413 of this Code or a similar local ordinance.

(b) No ordinance or regulation enacted under subsections 1, 4, 5, 6, 7, 9, 10, 11 or 13 of paragraph (a) shall be effective until signs giving reasonable notice of such local traffic regulations are posted.

(c) The provisions of this Code shall not prevent any municipality having a population of 500,000 or more inhabitants from prohibiting any person from driving or operating any motor vehicle upon the roadways of such municipality with headlamps on high beam or bright.

(d) The provisions of this Code shall not be deemed to prevent local authorities within the reasonable exercise of their police power from prohibiting, on private property, the unauthorized use of parking spaces reserved for persons with disabilities.

(e) No unit of local government, including a home rule unit, may enact or enforce an ordinance that applies only to motorcycles if the principal purpose for that ordinance is to restrict the access of motorcycles to any highway or portion of a highway for which federal or State funds have been used for the planning, design, construction, or maintenance of that highway. No unit of local government, including a home rule unit, may enact an ordinance requiring motorcycle users to wear protective headgear. Nothing in this subsection (e) shall affect the authority of a unit of local government to regulate motorcycles for traffic control purposes or in accordance with Section 12-602 of this Code. No unit of local government, including a home rule unit, may regulate motorcycles in a manner inconsistent with this Code. This subsection (e) is a limitation under subsection (i) of Section 6 of Article VII of the Illinois Constitution on the concurrent exercise by home rule units of powers and functions exercised by the State.

(f) A municipality or county designated in Section

11-208.6 may enact an ordinance providing for an automated traffic law enforcement system to enforce violations of this Code or a similar provision of a local ordinance and imposing liability on a registered owner of a vehicle used in such a violation.

(Source: P.A. 90-106, eff. 1-1-98; 90-513, eff. 8-22-97; 90-655, eff. 7-30-98; 91-519, eff. 1-1-00.)

(625 ILCS 5/11-208.3) (from Ch. 95 1/2, par. 11-208.3)

Sec. 11-208.3. Administrative adjudication of violations of traffic regulations concerning the standing, parking, or condition of vehicles and automated traffic law violations.

(a) Any municipality may provide by ordinance for a system of administrative adjudication of vehicular standing and parking violations and vehicle compliance violations as defined in this subsection and automated traffic law violations as defined in Section 11-208.6. The administrative system shall have as its purpose the fair and efficient enforcement of municipal regulations through the administrative adjudication of automated traffic law violations and violations of municipal ordinances regulating the standing and parking of vehicles, the condition and use of vehicle equipment, and the display of municipal wheel tax licenses within the municipality's borders. The administrative system shall only have authority to adjudicate civil offenses carrying fines not in excess of $250 that occur after the effective date of the ordinance adopting such a system under this Section. For purposes of this Section, "compliance violation" means a violation of a municipal regulation governing the condition or use of equipment on a vehicle or governing the display of a municipal wheel tax license.

(b) Any ordinance establishing a system of administrative adjudication under this Section shall provide for:

(1) A traffic compliance administrator authorized to adopt, distribute and process parking, ~~and~~ compliance, and automated traffic law violation notices and other notices

required by this Section, collect money paid as fines and penalties for violation of parking and compliance ordinances and automated traffic law violations, and operate an administrative adjudication system. The traffic compliance administrator also may make a certified report to the Secretary of State under Section 6-306.5.

(2) A parking, standing, ~~or~~ compliance, or automated traffic law violation notice that shall specify the date, time, and place of violation of a parking, standing, or compliance, or automated traffic law regulation; the particular regulation violated; the fine and any penalty that may be assessed for late payment, when so provided by ordinance; the vehicle make and state registration number; and the identification number of the person issuing the notice. With regard to automated traffic law violations, vehicle make shall be specified on the automated traffic law violation notice if the make is available and readily discernible. With regard to municipalities with a population of 1 million or more, it shall be grounds for dismissal of a parking violation if the State registration number or vehicle make specified is incorrect. The violation notice shall state that the payment of the indicated fine, and of any applicable penalty for late payment, shall operate as a final disposition of the violation. The notice also shall contain information as to the availability of a hearing in which the violation may be contested on its merits. The violation notice shall specify the time and manner in which a hearing may be had.

(3) Service of the parking, standing, or compliance violation notice by affixing the original or a facsimile of the notice to an unlawfully parked vehicle or by handing the notice to the operator of a vehicle if he or she is present and service of an automated traffic law violation notice by mail to the address of the registered owner of the cited vehicle as recorded with the Secretary of State within 30 days after the Secretary of State notifies the

municipality or county of the identity of the owner of the vehicle, but in no event later than 90 days after the violation. A person authorized by ordinance to issue and serve parking, standing, and compliance violation notices shall certify as to the correctness of the facts entered on the violation notice by signing his or her name to the notice at the time of service or in the case of a notice produced by a computerized device, by signing a single certificate to be kept by the traffic compliance administrator attesting to the correctness of all notices produced by the device while it was under his or her control. In the case of an automated traffic law violation, the ordinance shall require a determination by a technician employed or contracted by the municipality or county that, based on inspection of recorded images, the motor vehicle was being operated in violation of Section 11-208.6 or a local ordinance. If the technician determines that the vehicle entered the intersection as part of a funeral procession or in order to yield the right-of-way to an emergency vehicle, a citation shall not be issued. The original or a facsimile of the violation notice or, in the case of a notice produced by a computerized device, a printed record generated by the device showing the facts entered on the notice, shall be retained by the traffic compliance administrator, and shall be a record kept in the ordinary course of business. A parking, standing, ~~or~~ compliance, or automated traffic law violation notice issued, signed and served in accordance with this Section, a copy of the notice, or the computer generated record shall be prima facie correct and shall be prima facie evidence of the correctness of the facts shown on the notice. The notice, copy, or computer generated record shall be admissible in any subsequent administrative or legal proceedings.

(4) An opportunity for a hearing for the registered owner of the vehicle cited in the parking, standing, ~~or~~

compliance, or automated traffic law violation notice in which the owner may contest the merits of the alleged violation, and during which formal or technical rules of evidence shall not apply; provided, however, that under Section 11-1306 of this Code the lessee of a vehicle cited in the violation notice likewise shall be provided an opportunity for a hearing of the same kind afforded the registered owner. The hearings shall be recorded, and the person conducting the hearing on behalf of the traffic compliance administrator shall be empowered to administer oaths and to secure by subpoena both the attendance and testimony of witnesses and the production of relevant books and papers. Persons appearing at a hearing under this Section may be represented by counsel at their expense. The ordinance may also provide for internal administrative review following the decision of the hearing officer.

(5) Service of additional notices, sent by first class United States mail, postage prepaid, to the address of the registered owner of the cited vehicle as recorded with the Secretary of State or, if any notice to that address is returned as undeliverable, to the last known address recorded in a United States Post Office approved database, or, under Section 11-1306 of this Code, to the lessee of the cited vehicle at the last address known to the lessor of the cited vehicle at the time of lease or, if any notice to that address is returned as undeliverable, to the last known address recorded in a United States Post Office approved database. The service shall be deemed complete as of the date of deposit in the United States mail. The notices shall be in the following sequence and shall include but not be limited to the information specified herein:

(i) A second notice of parking, standing, or compliance violation. This notice shall specify the date and location of the violation cited in the parking, standing, or compliance violation notice, the

particular regulation violated, the vehicle make and state registration number, the fine and any penalty that may be assessed for late payment when so provided by ordinance, the availability of a hearing in which the violation may be contested on its merits, and the time and manner in which the hearing may be had. The notice of violation shall also state that failure either to pay the indicated fine and any applicable penalty, or to appear at a hearing on the merits in the time and manner specified, will result in a final determination of violation liability for the cited violation in the amount of the fine or penalty indicated, and that, upon the occurrence of a final determination of violation liability for the failure, and the exhaustion of, or failure to exhaust, available administrative or judicial procedures for review, any unpaid fine or penalty will constitute a debt due and owing the municipality.

(ii) A notice of final determination of parking, standing, ~~or~~ compliance, or automated traffic law violation liability. This notice shall be sent following a final determination of parking, standing, ~~or~~ compliance, or automated traffic law violation liability and the conclusion of judicial review procedures taken under this Section. The notice shall state that the unpaid fine or penalty is a debt due and owing the municipality. The notice shall contain warnings that failure to pay any fine or penalty due and owing the municipality within the time specified may result in the municipality's filing of a petition in the Circuit Court to have the unpaid fine or penalty rendered a judgment as provided by this Section, or may result in suspension of the person's drivers license for failure to pay fines or penalties for 10 or more parking violations under Section 6-306.5 or 5 or more automated traffic law violations under Section

11-208.6.

(6) A Notice of impending drivers license suspension. This notice shall be sent to the person liable for any fine or penalty that remains due and owing on 10 or more parking violations or 5 or more unpaid automated traffic law violations. The notice shall state that failure to pay the fine or penalty owing within 45 days of the notice's date will result in the municipality notifying the Secretary of State that the person is eligible for initiation of suspension proceedings under Section 6-306.5 of this Code. The notice shall also state that the person may obtain a photostatic copy of an original ticket imposing a fine or penalty by sending a self addressed, stamped envelope to the municipality along with a request for the photostatic copy. The notice of impending drivers license suspension shall be sent by first class United States mail, postage prepaid, to the address recorded with the Secretary of State or, if any notice to that address is returned as undeliverable, to the last known address recorded in a United States Post Office approved database.

(7) Final determinations of violation liability. A final determination of violation liability shall occur following failure to pay the fine or penalty after a hearing officer's determination of violation liability and the exhaustion of or failure to exhaust any administrative review procedures provided by ordinance. Where a person fails to appear at a hearing to contest the alleged violation in the time and manner specified in a prior mailed notice, the hearing officer's determination of violation liability shall become final: (A) upon denial of a timely petition to set aside that determination, or (B) upon expiration of the period for filing the petition without a filing having been made.

(8) A petition to set aside a determination of parking, standing, ~~or~~ compliance, or automated traffic law violation liability that may be filed by a person owing an

unpaid fine or penalty. The petition shall be filed with and ruled upon by the traffic compliance administrator in the manner and within the time specified by ordinance. The grounds for the petition may be limited to: (A) the person not having been the owner or lessee of the cited vehicle on the date the violation notice was issued, (B) the person having already paid the fine or penalty for the violation in question, and (C) excusable failure to appear at or request a new date for a hearing. With regard to municipalities with a population of 1 million or more, it shall be grounds for dismissal of a parking violation if the State registration number, or vehicle make if specified, is incorrect. After the determination of parking, standing, ~~or~~ compliance, or automated traffic law violation liability has been set aside upon a showing of just cause, the registered owner shall be provided with a hearing on the merits for that violation.

(9) Procedures for non-residents. Procedures by which persons who are not residents of the municipality may contest the merits of the alleged violation without attending a hearing.

(10) A schedule of civil fines for violations of vehicular standing, parking, ~~and~~ compliance, or automated traffic law regulations enacted by ordinance pursuant to this Section, and a schedule of penalties for late payment of the fines, provided, however, that the total amount of the fine and penalty for any one violation shall not exceed $250.

(11) Other provisions as are necessary and proper to carry into effect the powers granted and purposes stated in this Section.

(c) Any municipality establishing vehicular standing, parking, ~~and~~ compliance, or automated traffic law regulations under this Section may also provide by ordinance for a program of vehicle immobilization for the purpose of facilitating enforcement of those regulations. The program of vehicle

immobilization shall provide for immobilizing any eligible vehicle upon the public way by presence of a restraint in a manner to prevent operation of the vehicle. Any ordinance establishing a program of vehicle immobilization under this Section shall provide:

(1) Criteria for the designation of vehicles eligible for immobilization. A vehicle shall be eligible for immobilization when the registered owner of the vehicle has accumulated the number of unpaid final determinations of parking, standing, ~~or~~ compliance, or automated traffic law violation liability as determined by ordinance.

(2) A notice of impending vehicle immobilization and a right to a hearing to challenge the validity of the notice by disproving liability for the unpaid final determinations of parking, standing, ~~or~~ compliance, or automated traffic law violation liability listed on the notice.

(3) The right to a prompt hearing after a vehicle has been immobilized or subsequently towed without payment of the outstanding fines and penalties on parking, standing, ~~or~~ compliance, or automated traffic law violations for which final determinations have been issued. An order issued after the hearing is a final administrative decision within the meaning of Section 3-101 of the Code of Civil Procedure.

(4) A post immobilization and post-towing notice advising the registered owner of the vehicle of the right to a hearing to challenge the validity of the impoundment.

(d) Judicial review of final determinations of parking, standing, ~~and~~ compliance, or automated traffic law violations and final administrative decisions issued after hearings regarding vehicle immobilization and impoundment made under this Section shall be subject to the provisions of the Administrative Review Law.

(e) Any fine, penalty, or part of any fine or any penalty remaining unpaid after the exhaustion of, or the failure to

exhaust, administrative remedies created under this Section and the conclusion of any judicial review procedures shall be a debt due and owing the municipality and, as such, may be collected in accordance with applicable law. Payment in full of any fine or penalty resulting from a standing, parking, ~~or~~ compliance, or automated traffic law violation shall constitute a final disposition of that violation.

(f) After the expiration of the period within which judicial review may be sought for a final determination of parking, standing, ~~or~~ compliance, or automated traffic law violation, the municipality may commence a proceeding in the Circuit Court for purposes of obtaining a judgment on the final determination of violation. Nothing in this Section shall prevent a municipality from consolidating multiple final determinations of parking, standing, ~~or~~ compliance, or automated traffic law violations ~~violation~~ against a person in a proceeding. Upon commencement of the action, the municipality shall file a certified copy or record of the final determination of parking, standing, ~~or~~ compliance, or automated traffic law violation, which shall be accompanied by a certification that recites facts sufficient to show that the final determination of violation was issued in accordance with this Section and the applicable municipal ordinance. Service of the summons and a copy of the petition may be by any method provided by Section 2-203 of the Code of Civil Procedure or by certified mail, return receipt requested, provided that the total amount of fines and penalties for final determinations of parking, standing, ~~or~~ compliance, or automated traffic law violations does not exceed $2500. If the court is satisfied that the final determination of parking, standing, ~~or~~ compliance, or automated traffic law violation was entered in accordance with the requirements of this Section and the applicable municipal ordinance, and that the registered owner or the lessee, as the case may be, had an opportunity for an administrative hearing and for judicial review as provided in this Section, the court shall render judgment in favor of the

municipality and against the registered owner or the lessee for the amount indicated in the final determination of parking, standing, ~~or~~ compliance, or automated traffic law violation, plus costs. The judgment shall have the same effect and may be enforced in the same manner as other judgments for the recovery of money.

(Source: P.A. 94-294, eff. 1-1-06.)

(625 ILCS 5/11-208.6 new)

Sec. 11-208.6. Automated traffic law enforcement system.

(a) As used in this Section, "automated traffic law enforcement system" means a device with one or more motor vehicle sensors working in conjunction with a red light signal to produce recorded images of motor vehicles entering an intersection against a red signal indication in violation of Section 11-306 of this Code or a similar provision of a local ordinance.

An automated traffic law enforcement system is a system, in a municipality or county operated by a governmental agency, that produces a recorded image of a motor vehicle's violation of a provision of this Code or a local ordinance and is designed to obtain a clear recorded image of the vehicle and the vehicle's license plate. The recorded image must also display the time, date, and location of the violation.

(b) As used in this Section, "recorded images" means images recorded by an automated traffic law enforcement system on:

(1) 2 or more photographs;

(2) 2 or more microphotographs;

(3) 2 or more electronic images; or

(4) a video recording showing the motor vehicle and, on at least one image or portion of the recording, clearly identifying the registration plate number of the motor vehicle.

(c) A county or municipality, including a home rule county or municipality, may not use an automated traffic law

enforcement system to provide recorded images of a motor vehicle for the purpose of recording its speed. The regulation of the use of automated traffic law enforcement systems to record vehicle speeds is an exclusive power and function of the State. This subsection (c) is a denial and limitation of home rule powers and functions under subsection (h) of Section 6 of Article VII of the Illinois Constitution.

(d) For each violation of a provision of this Code or a local ordinance recorded by an automatic traffic law enforcement system, the county or municipality having jurisdiction shall issue a written notice of the violation to the registered owner of the vehicle as the alleged violator. The notice shall be delivered to the registered owner of the vehicle, by mail, within 30 days after the Secretary of State notifies the municipality or county of the identity of the owner of the vehicle, but in no event later than 90 days after the violation.

The notice shall include:

(1) the name and address of the registered owner of the vehicle;

(2) the registration number of the motor vehicle involved in the violation;

(3) the violation charged;

(4) the location where the violation occurred;

(5) the date and time of the violation;

(6) a copy of the recorded images;

(7) the amount of the civil penalty imposed and the date by which the civil penalty should be paid;

(8) a statement that recorded images are evidence of a violation of a red light signal;

(9) a warning that failure to pay the civil penalty or to contest liability in a timely manner is an admission of liability and may result in a suspension of the driving privileges of the registered owner of the vehicle; and

(10) a statement that the person may elect to proceed by:

(A) paying the fine; or

(B) challenging the charge in court, by mail, or by administrative hearing.

(e) If a person charged with a traffic violation, as a result of an automated traffic law enforcement system, does not pay or successfully contest the civil penalty resulting from that violation, the Secretary of State shall suspend the driving privileges of the registered owner of the vehicle under Section 6-306.5 of this Code for failing to pay any fine or penalty due and owing as a result of 5 violations of the automated traffic law enforcement system.

(f) Based on inspection of recorded images produced by an automated traffic law enforcement system, a notice alleging that the violation occurred shall be evidence of the facts contained in the notice and admissible in any proceeding alleging a violation under this Section.

(g) Recorded images made by an automatic traffic law enforcement system are confidential and shall be made available only to the alleged violator and governmental and law enforcement agencies for purposes of adjudicating a violation of this Section, for statistical purposes, or for other governmental purposes. Any recorded image evidencing a violation of this Section, however, may be admissible in any proceeding resulting from the issuance of the citation.

(h) The court or hearing officer may consider in defense of a violation:

(1) that the motor vehicle or registration plates of the motor vehicle were stolen before the violation occurred and not under the control of or in the possession of the owner at the time of the violation;

(2) that the driver of the vehicle passed through the intersection when the light was red either (i) in order to yield the right-of-way to an emergency vehicle or (ii) as part of a funeral procession; and

(3) any other evidence or issues provided by municipal or county ordinance.

(i) To demonstrate that the motor vehicle or the registration plates were stolen before the violation occurred and were not under the control or possession of the owner at the time of the violation, the owner must submit proof that a report concerning the stolen motor vehicle or registration plates was filed with a law enforcement agency in a timely manner.

(j) Unless the driver of the motor vehicle received a Uniform Traffic Citation from a police officer at the time of the violation, the motor vehicle owner is subject to a civil penalty not exceeding $100, plus an additional penalty of not more than $100 for failure to pay the original penalty in a timely manner, if the motor vehicle is recorded by an automated traffic law enforcement system. A violation for which a civil penalty is imposed under this Section is not a violation of a traffic regulation governing the movement of vehicles and may not be recorded on the driving record of the owner of the vehicle.

(k) An intersection equipped with an automated traffic law enforcement system must be posted with a sign visible to approaching traffic indicating that the intersection is being monitored by an automated traffic law enforcement system.

(l) The compensation paid for an automated traffic law enforcement system must be based on the value of the equipment or the services provided and may not be based on the number of traffic citations issued or the revenue generated by the system.

(m) This Section applies only to the counties of Cook, DuPage, Kane, Lake, Madison, McHenry, St. Clair, and Will and to municipalities located within those counties.

(625 ILCS 5/11-306) (from Ch. 95 1/2, par. 11-306)

Sec. 11-306. Traffic-control signal legend. Whenever traffic is controlled by traffic-control signals exhibiting different colored lights or color lighted arrows, successively one at a time or in combination, only the colors green, red and

yellow shall be used, except for special pedestrian signals carrying a word legend, and the lights shall indicate and apply to drivers of vehicles and pedestrians as follows:

(a) Green indication.

1. Vehicular traffic facing a circular green signal may proceed straight through or turn right or left unless a sign at such place prohibits either such turn. Vehicular traffic, including vehicles turning right or left, shall yield the right of way to other vehicles and to pedestrians lawfully within the intersection or an adjacent crosswalk at the time such signal is exhibited.

2. Vehicular traffic facing a green arrow signal, shown alone or in combination with another indication, may cautiously enter the intersection only to make the movement indicated by such arrow, or such other movement as is permitted by other indications shown at the same time. Such vehicular traffic shall yield the right of way to pedestrians lawfully within an adjacent crosswalk and to other traffic lawfully using the intersection.

3. Unless otherwise directed by a pedestrian-control signal, as provided in Section 11-307, pedestrians facing any green signal, except when the sole green signal is a turn arrow, may proceed across the roadway within any marked or unmarked crosswalk.

(b) Steady yellow indication.

1. Vehicular traffic facing a steady circular yellow or yellow arrow signal is thereby warned that the related green movement is being terminated or that a red indication will be exhibited immediately thereafter.

2. Pedestrians facing a steady circular yellow or yellow arrow signal, unless otherwise directed by a pedestrian-control signal as provided in Section 11-307, are thereby advised that there is insufficient time to cross the roadway before a red indication is shown and no pedestrian shall then start to cross the roadway.

(c) Steady red indication.

1. Except as provided in paragraph 3 of this subsection (c), vehicular traffic facing a steady circular red signal alone shall stop at a clearly marked stop line, but if there is no such stop line, before entering the crosswalk on the near side of the intersection, or if there is no such crosswalk, then before entering the intersection, and shall remain standing until an indication to proceed is shown.

2. Except as provided in paragraph 3 of this subsection (c), vehicular traffic facing a steady red arrow signal shall not enter the intersection to make the movement indicated by the arrow and, unless entering the intersection to make a movement permitted by another signal, shall stop at a clearly marked stop line, but if there is no such stop line, before entering the crosswalk on the near side of the intersection, or if there is no such crosswalk, then before entering the intersection, and shall remain standing until an indication permitting the movement indicated by such red arrow is shown.

3. Except when a sign is in place prohibiting a turn and local authorities by ordinance or State authorities by rule or regulation prohibit any such turn, vehicular traffic facing any steady red signal may cautiously enter the intersection to turn right, or to turn left from a one-way street into a one-way street, after stopping as required by paragraph 1 or paragraph 2 of this subsection. After stopping, the driver shall yield the right of way to any vehicle in the intersection or approaching on another roadway so closely as to constitute an immediate hazard during the time such driver is moving across or within the intersection or junction or roadways. Such driver shall yield the right of way to pedestrians within the intersection or an adjacent crosswalk.

4. Unless otherwise directed by a pedestrian-control signal as provided in Section 11-307, pedestrians facing a steady circular red or red arrow signal alone shall not

enter the roadway.

~~5. A municipality with a population of 1,000,000 or more may enact an ordinance that provides for the use of an automated red light enforcement system to enforce violations of this subsection (c) that result in or involve a motor vehicle accident, leaving the scene of a motor vehicle accident, or reckless driving that results in bodily injury.~~

~~This paragraph 5 is subject to prosecutorial discretion that is consistent with applicable law.~~

(d) In the event an official traffic control signal is erected and maintained at a place other than an intersection, the provisions of this Section shall be applicable except as to provisions which by their nature can have no application. Any stop required shall be at a traffic sign or a marking on the pavement indicating where the stop shall be made or, in the absence of such sign or marking, the stop shall be made at the signal.

(e) The motorman of any streetcar shall obey the above signals as applicable to vehicles.

(Source: P.A. 90-86, eff. 7-10-97; 91-357, eff. 7-29-99.)

(625 ILCS 5/11-612 new)

Sec. 11-612. Certain systems to record vehicle speeds prohibited. Except as authorized in the Automated Traffic Control Systems in Highway Construction or Maintenance Zones Act, no photographic, video, or other imaging system may be used in this State to record vehicle speeds for the purpose of enforcing any law or ordinance regarding a maximum or minimum speed limit unless a law enforcement officer is present at the scene and witnesses the event. No State or local governmental entity, including a home rule county or municipality, may use such a system in a way that is prohibited by this Section. The regulation of the use of such systems is an exclusive power and function of the State. This Section is a denial and limitation of home rule powers and functions under subsection (h) of

Section 6 of Article VII of the Illinois Constitution.

(625 ILCS 5/1-105.5 rep.)

Section 10. The Illinois Vehicle Code is amended by repealing Section 1-105.5.

Section 99. Effective date. This Act takes effect upon becoming law.

Public Act 094-0771

SB2865 Enrolled LRB094 19100 DRH 54615 b

AN ACT concerning transportation.

Be it enacted by the People of the State of Illinois, represented in the General Assembly:

Section 5. The Illinois Vehicle Code is amended by changing Section 11-1201.1 and adding Sections 11-612 and 11-1201.5 as follows:

(625 ILCS 5/11-612 new)

Sec. 11-612. Certain systems to record vehicle speeds prohibited. Except as authorized in the Automated Traffic Control Systems in Highway Construction or Maintenance Zones Act, no photographic, video, or other imaging system may be used in this State to record vehicle speeds for the purpose of enforcing any law or ordinance regarding a maximum or minimum speed limit unless a law enforcement officer is present at the scene and witnesses the event. No State or local governmental entity, including a home rule county or municipality, may use such a system in a way that is prohibited by this Section. The regulation of the use of such systems is an exclusive power and function of the State. This Section is a denial and limitation of home rule powers and functions under subsection (h) of Section 6 of Article VII of the Illinois Constitution.

(625 ILCS 5/11-1201.1)

Sec. 11-1201.1. Automated Railroad Crossing Enforcement System Pilot Project.

(a) For the purposes of this Section, an automated railroad grade crossing enforcement system is a system operated by a law enforcement agency that records a driver's response to automatic, electrical or mechanical signal devices and crossing gates. The system shall be designed to obtain a clear photograph or other recorded image of the vehicle, vehicle operator and the vehicle registration plate of a vehicle in

violation of Section 11-1201. The photograph or other recorded image shall also display the time, date and location of the violation.

(b) Commencing on January 1, 1996, the Illinois Commerce Commission and the Commuter Rail Board of the Regional Transportation Authority shall, in cooperation with local law enforcement agencies, establish a 5 year pilot program within a county with a population of between 750,000 and 1,000,000 using an automated railroad grade crossing enforcement system. The Commission shall determine the 3 railroad grade crossings within that county that pose the greatest threat to human life based upon the number of accidents and fatalities at the crossings during the past 5 years and with approval of the local law enforcement agency equip the crossings with an automated railroad grade crossing enforcement system.

(b-1) Commencing on July 20, 2001 (the effective date of Public Act 92-98), the Illinois Commerce Commission and the Commuter Rail Board may, in cooperation with the local law enforcement agency, establish in a county with a population of between 750,000 and 1,000,000 a 2 year pilot program using an automated railroad grade crossing enforcement system. This pilot program may be established at a railroad grade crossing designated by local authorities. No State moneys may be expended on the automated railroad grade crossing enforcement system established under this pilot program.

(c) For each violation of Section 11-1201 recorded by an automatic railroad grade crossing system, the local law enforcement agency having jurisdiction shall issue a written Uniform Traffic Citation of the violation to the registered owner of the vehicle as the alleged violator. The Uniform Traffic Citation shall be delivered to the registered owner of the vehicle, by mail, within 30 days of the violation. The Uniform Traffic Citation shall include the name and address of vehicle owner, the vehicle registration number, the offense charged, the time, date, and location of the violation, the first available court date and that the basis of the citation

is the photograph or other recorded image from the automated railroad grade crossing enforcement system.

(d) The Uniform Traffic Citation issued to the registered owner of the vehicle shall be accompanied by a written notice, the contents of which is set forth in subsection (d-1) of this Section, explaining how the registered owner of the vehicle can elect to proceed by either paying the fine or challenging the issuance of the Uniform Traffic Citation.

(d-1) The written notice explaining the alleged violator's rights and obligations must include the following text:

"You have been served with the accompanying Uniform Traffic Citation and cited with having violated Section 11-1201 of the Illinois Vehicle Code. You can elect to proceed by:

1. Paying the fine; or

2. Challenging the issuance of the Uniform Traffic Citation in court; or

3. If you were not the operator of the vehicle at the time of the alleged offense, notifying in writing the local law enforcement agency that issued the Uniform Traffic Citation of the number of the Uniform Traffic Citation received and the name and address of the person operating the vehicle at the time of the alleged offense. If you fail to so notify in writing the local law enforcement agency of the name and address of the operator of the vehicle at the time of the alleged offense, you may be presumed to have been the operator of the vehicle at the time of the alleged offense."

(d-2) If the registered owner of the vehicle was not the operator of the vehicle at the time of the alleged offense, and if the registered owner notifies the local law enforcement agency having jurisdiction of the name and address of the operator of the vehicle at the time of the alleged offense, the local law enforcement agency having jurisdiction shall then issue a written Uniform Traffic Citation to the person alleged by the registered owner to have been the operator of the vehicle at the time of the alleged offense. If the registered

owner fails to notify in writing the local law enforcement agency having jurisdiction of the name and address of the operator of the vehicle at the time of the alleged offense, the registered owner may be presumed to have been the operator of the vehicle at the time of the alleged offense.

(e) Evidence.

(i) A certificate alleging that a violation of Section 11-1201 occurred, sworn to or affirmed by a duly authorized agency, based on inspection of recorded images produced by an automated railroad crossing enforcement system are evidence of the facts contained in the certificate and are admissible in any proceeding alleging a violation under this Section.

(ii) Photographs or recorded images made by an automatic railroad grade crossing enforcement system are confidential and shall be made available only to the alleged violator and governmental and law enforcement agencies for purposes of adjudicating a violation of Section 11-1201 of the Illinois Vehicle Code. <u>The photographs may also be made available to governmental agencies for the purpose of a safety analysis of the crossing where the automatic railroad grade crossing enforcement system is installed.</u> However, any photograph or other recorded image evidencing a violation of Section 11-1201 shall be admissible in any proceeding resulting from the issuance of the Uniform Traffic Citation when there is reasonable and sufficient proof of the accuracy of the camera or electronic instrument recording the image. There is a rebuttable presumption that the photograph or recorded image is accurate if the camera or electronic recording instrument was in good working order at the beginning and the end of the day of the alleged offense.

(f) Rail crossings equipped with an automatic railroad grade crossing enforcement system shall be posted with a sign visible to approaching traffic stating that the railroad grade crossing is being monitored, that citations will be issued, and

the amount of the fine for violation.

(g) Except as provided in subsection (b-1), the cost of the installation and maintenance of each automatic railroad grade crossing enforcement system shall be paid from the Grade Crossing Protection Fund if the rail line is not owned by Commuter Rail Board of the Regional Transportation Authority. Except as provided in subsection (b-1), if the rail line is owned by the Commuter Rail Board of the Regional Transportation Authority, the costs of the installation and maintenance shall be paid from the Regional Transportation Authority's portion of the Public Transportation Fund.

(h) The Illinois Commerce Commission shall issue a report to the General Assembly at the conclusion of the 5 year pilot program established under subsection (b) on the effectiveness of the automatic railroad grade crossing enforcement system.

(i) If any part or parts of this Section are held by a court of competent jurisdiction to be unconstitutional, the unconstitutionality shall not affect the validity of the remaining parts of this Section. The General Assembly hereby declares that it would have passed the remaining parts of this Section if it had known that the other part or parts of this Section would be declared unconstitutional.

(j) Penalty.

(i) A violation of this Section is a petty offense for which a fine of $250 shall be imposed for a first violation, and a fine of $500 shall be imposed for a second or subsequent violation. The court may impose 25 hours of community service in place of the $250 fine for the first violation.

(ii) For a second or subsequent violation, the Secretary of State may suspend the registration of the motor vehicle for a period of at least 6 months.

(Source: P.A. 92-98, eff. 7-20-01; 92-245, eff. 8-3-01; 92-651, eff 7-11-02; 92-814, eff. 1-1-03.)

(625 ILCS 5/11-1201.5 new)

Sec. 11-1201.5. Automated railroad crossing enforcement system.

(a) For the purposes of this Section, an automated railroad grade crossing enforcement system is a system operated by a law enforcement agency that records a driver's response to automatic, electrical, or mechanical signal devices and crossing gates. The system shall be designed to obtain a clear photograph or other recorded image of the vehicle, vehicle operator, and the vehicle registration plate of a vehicle in violation of Section 11-1201 or 11-1425. The photograph or other recorded image shall also display the time, date, and location of the violation.

(b) The Illinois Commerce Commission and the Illinois Department of Transportation may, in cooperation with a local law enforcement agency, establish in any county or municipality an automated railroad grade crossing enforcement system at any railroad grade crossing designated by local authorities. Local authorities desiring the establishment of an automated railroad crossing enforcement system must initiate the process by enacting a local ordinance requesting the creation of such a system. After the ordinance has been enacted, and before any additional steps toward the establishment of the system are undertaken, the local authorities, the Commission, and the Department must agree to a plan for obtaining, from any combination of federal, State, and local funding sources, the moneys required for the purchase and installation of any necessary equipment.

(c) For each violation of Section 11-1201 or 11-1425 recorded by an automatic railroad grade crossing system, the local law enforcement agency having jurisdiction shall issue a written Uniform Traffic Citation of the violation to the registered owner of the vehicle as the alleged violator. The Uniform Traffic Citation shall be delivered to the registered owner of the vehicle, by mail, within 30 days of the violation. The Uniform Traffic Citation shall include the name and address of vehicle owner, the vehicle registration number, the offense

charged, the time, date, and location of the violation, the first available court date, and that the basis of the citation is the photograph or other recorded image from the automated railroad grade crossing enforcement system.

(d) The Uniform Traffic Citation issued to the registered owner of the vehicle shall be accompanied by a written notice, the contents of which is set forth in subsection (e) of this Section, explaining how the registered owner of the vehicle can elect to proceed by either paying the fine or challenging the issuance of the Uniform Traffic Citation.

(e) The written notice explaining the alleged violator's rights and obligations must include the following text:

"You have been served with the accompanying Uniform Traffic Citation and cited with having violated Section 11-1201 or 11-1425 of the Illinois Vehicle Code. You can elect to proceed by:

1. Paying the fine; or

2. Challenging the issuance of the Uniform Traffic Citation in court; or

3. If you were not the operator of the vehicle at the time of the alleged offense, notifying in writing the local law enforcement agency that issued the Uniform Traffic Citation of the number of the Uniform Traffic Citation received and the name and address of the person operating the vehicle at the time of the alleged offense. If you fail to so notify in writing the local law enforcement agency of the name and address of the operator of the vehicle at the time of the alleged offense, you may be presumed to have been the operator of the vehicle at the time of the alleged offense."

(f) If the registered owner of the vehicle was not the operator of the vehicle at the time of the alleged offense, and if the registered owner notifies the local law enforcement agency having jurisdiction of the name and address of the operator of the vehicle at the time of the alleged offense, the local law enforcement agency having jurisdiction shall then

issue a written Uniform Traffic Citation to the person alleged by the registered owner to have been the operator of the vehicle at the time of the alleged offense. If the registered owner fails to notify in writing the local law enforcement agency having jurisdiction of the name and address of the operator of the vehicle at the time of the alleged offense, the registered owner may be presumed to have been the operator of the vehicle at the time of the alleged offense.

(g) Evidence.

(1) A certificate alleging that a violation of Section 11-1201 or 11-1425 occurred, sworn to or affirmed by a duly authorized agency, based on inspection of recorded images produced by an automated railroad crossing enforcement system, are evidence of the facts contained in the certificate and are admissible in any proceeding alleging a violation under this Section.

(2) Photographs or recorded images made by an automatic railroad grade crossing enforcement system are confidential and shall be made available only to the alleged violator and governmental and law enforcement agencies for purposes of adjudicating a violation of Section 11-1201 or 11-1425 of the Illinois Vehicle Code. The photographs may also be made available to governmental agencies for the purpose of a safety analysis of the crossing where the automatic railroad grade crossing enforcement system is installed. However, any photograph or other recorded image evidencing a violation of Section 11-1201 or 11-1425 shall be admissible in any proceeding resulting from the issuance of the Uniform Traffic Citation when there is reasonable and sufficient proof of the accuracy of the camera or electronic instrument recording the image. There is a rebuttable presumption that the photograph or recorded image is accurate if the camera or electronic recording instrument was in good working order at the beginning and the end of the day of the alleged offense.

(h) Rail crossings equipped with an automatic railroad grade crossing enforcement system shall be posted with a sign visible to approaching traffic stating that the railroad grade crossing is being monitored, that citations will be issued, and the amount of the fine for violation.

(i) A county or municipality, including a home rule county or municipality, may not use an automated railroad crossing enforcement system to provide recorded images of a motor vehicle for the purpose of recording its speed. The regulation of the use of automated railroad crossing enforcement systems to record vehicle speeds is an exclusive power and function of the State. This subsection (i) is a denial and limitation of home rule powers and functions under subsection (h) of Section 6 of Article VII of the Illinois Constitution.

(j) If any part or parts of this Section are held by a court of competent jurisdiction to be unconstitutional, the unconstitutionality shall not affect the validity of the remaining parts of this Section. The General Assembly hereby declares that it would have passed the remaining parts of this Section if it had known that the other part or parts of this Section would be declared unconstitutional.

(k) Penalty.

(1) A violation of this Section is a petty offense for which a fine of $250 shall be imposed for a first violation, and a fine of $500 shall be imposed for a second or subsequent violation. The court may impose 25 hours of community service in place of the $250 fine for the first violation.

(2) For a second or subsequent violation, the Secretary of State may suspend the registration of the motor vehicle for a period of at least 6 months.

RESOLUTION AGREEING TO INDEMNIFY THE STATE OF ILLINOIS FOR PHOTO ENFORCEMENT EQUIPMENT ATTACHED TO IDOT FACILITIES

WHEREAS, the Town, Village, City of _____, is desirous of constructing certain facilities attached to Illinois Department of Transportation facilities ("IDOT"); and

WHEREAS, the Illinois Department of Transportation has determined that the attachment of photo enforcement equipment to its facilities may be permitted and is in the interest of increasing the safety of the motoring public; and

WHEREAS, pursuant to Safety Engineering Policy Memorandum 2-07, IDOT will issue a permit for the attachment of photo enforcement equipment to IDOT facilities provided that IDOT has obtained a resolution from the Town, Village, City of _____ agreeing to identify the State of Illinois; and

WHEREAS, the Town, Village, City of _____ deems it in the interest of the Town, Village, City of _____ to adopt such a resolution to facilitate safety of the motoring public.

THEREFORE, Be It Resolved by the Council of the Town, Village, City of _____ agrees to indemnify and hold harmless the State of Illinois for any claims that may be made against the State of Illinois, its employees, agents and the Illinois Department of Transportation as a result of attachment and operation of photo enforcement equipment to IDOT facilities.

Passed by the Mayor and the City Council for the Town, Village, City of _____, on the ____ day of _____, 2007.

_____

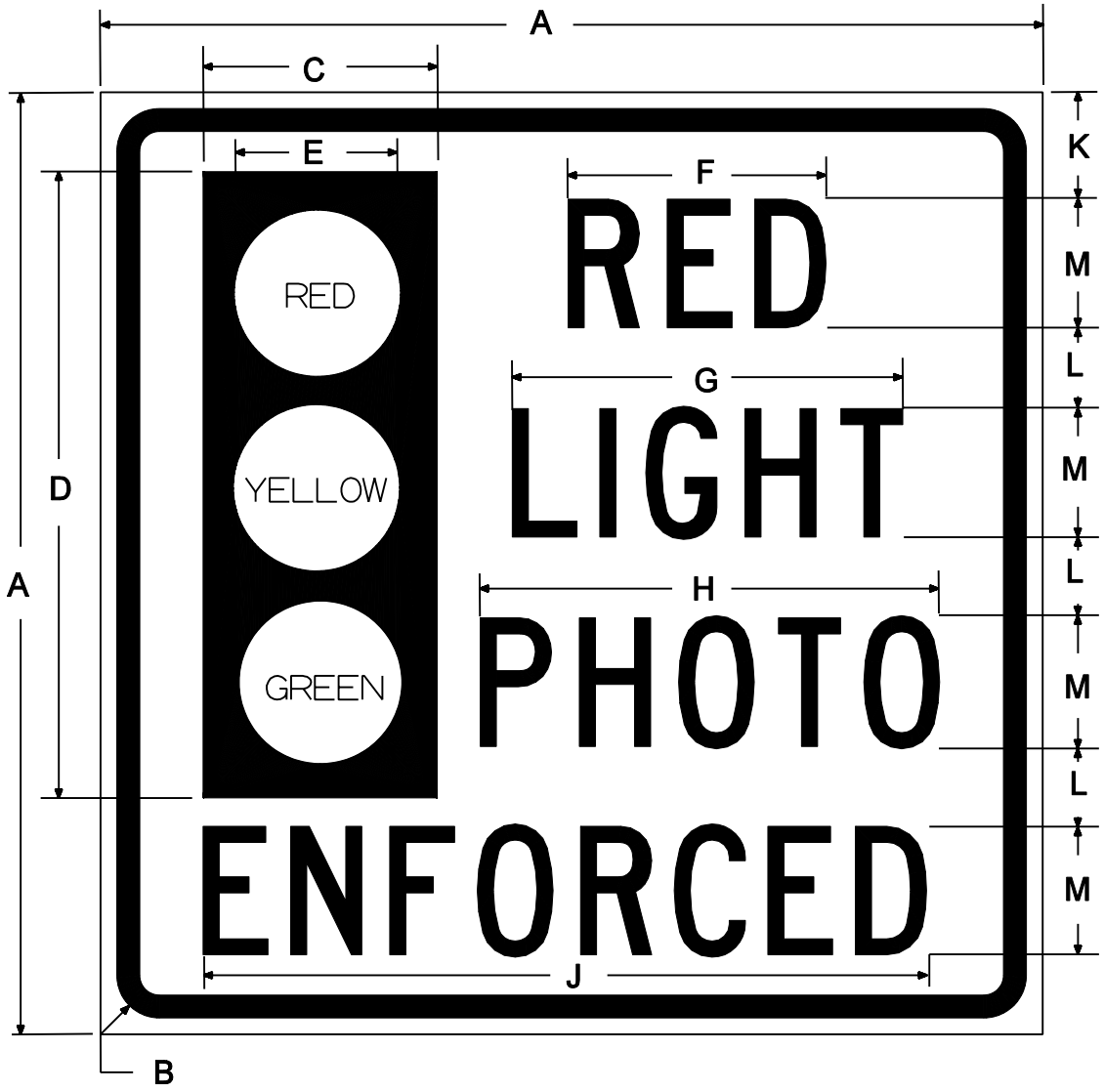
MAYOR

ATTEST:

_____

City Clerk

ILLINOIS STANDARD
R10-I104



COLOR	LEGEND AND BORDER	BLACK	NON-REFLECTORIZED
	BACKGROUND	WHITE	REFLECTORIZED
	LIGHTS	COLORED	REFLECTORIZED

SIGN SIZE	DIMENSIONS											
	A	B	C	D	E	F	G	H	J	K	L	M
30 X 30	30.00	1.88	7.30	19.60	5.40	7.80	12.00	14.00	22.20	2.80	2.80	4.00
36 X 36	36.00	2.25	8.90	24.00	6.40	9.80	15.00	17.60	27.60	3.50	3.00	5.00

SIGN SIZE	SERIES BY LINE				MARGIN	BORDER
	1	2	3	4		
30 X 30	4C	4C	4C	4C	0.500	0.750
36 X 36	5C	5C	5C	5C	0.625	0.875

All dimensions in inches. Sign not to scale.

Attachment D

ILLINOIS STANDARD

R10-I105

COLOR	LEGEND AND BORDER	BLACK	NON-REFLECTORIZED
	BACKGROUND	WHITE	REFLECTORIZED

SIGN SIZE	DIMENSIONS								
	A	B	C	D	E	F	G	H	J
30 X 30	30.00	1.88	21.20	14.00	22.20	24.20	3.25	4.00	2.50
36 X 36	36.00	2.25	26.60	17.60	27.60	30.40	3.50	5.00	3.00

SIGN SIZE	SERIES BY LINE				MARGIN	BORDER
	1	2	3	4		
30 X 30	4C	4C	4C	4C	0.500	0.750
36 X 36	5C	5C	5C	5C	0.625	0.875

All dimensions in inches. Sign not to scale.

Attachment E